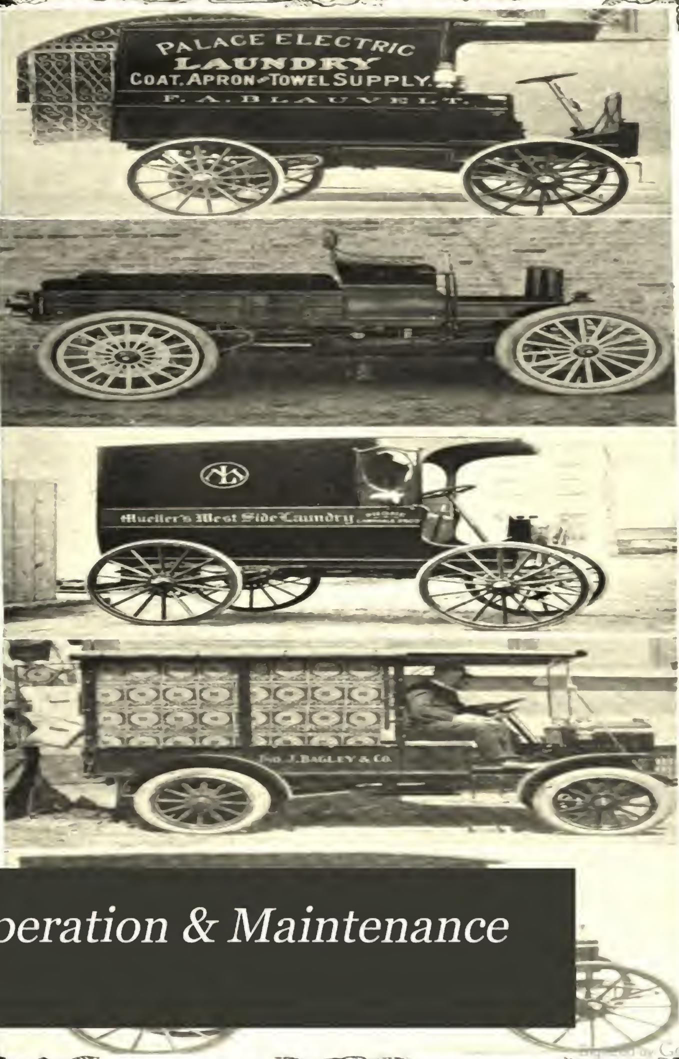

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New York Shows Open—Complete Car Specifications

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The COMMERCIAL VEHICLE

Vol. VII JANUARY 1912 No. 1

ALCO
Motor Trucks

What Do Your Horses Cost?

A Scientific Cost Analysis May Save You Annually From 15 to 40 Per Cent

THERE are 30,000,000 horses in use in the United States, representing in money value something like $3,000,000,000.

Few owners know what their horses are costing them—probably less than one per cent of horse owners know.

In other departments of a company's business costs are known to a penny—manufacturing costs, selling costs, and so on.

Why should not *horse* costs be known?

The possible saving as a result may run all the way from 15 to 40 per cent.

The way to find out is to put expert transportation cost accountants to work.

The best of them, as every one in the business knows, is W. P. Kennedy.

Mr. Kennedy is head of the new Transportation Cost Bureau of the American Locomotive Company, motor truck department. He has a corps of assistants—cost accountants, transportation engineers, expert horse men.

This Bureau will *blue print* your horse transportation system—*without cost to you*. They will supply you with facts and figures. They will tell you how much your horses are actually costing you.

They will diagram your routes, time schedule the movements of your wagons, record how much time each day your horses are standing still, figure out the average life of them, and so on.

On your desk they will place a *picture* of your whole horse system. At a glance you will see your horse situation. The figures will tell their own unvarnished story.

This Bureau will go further. It will determine if you can use motor trucks profitably. It will operate motor trucks in your service, reroute your hauls, eliminate waste of time loading and unloading. It will improve your method of handling merchandise or freight.

It will *chart* your complete transportation system with motor equipment.

In one composite picture, this bureau will display before you the saving of motor over horses—in dollars and cents—in figures and facts.

The amount of saving depends on the nature and extent of your transportation. The saving generally will average from 15 to 40 per cent.

Consider for a moment, what a 15 per cent saving annually on your horse transportation expense would amount to.

What you should be interested in now is an *analysis* of your situation.

Why depend on your own confusing lack of information.

The matter of selecting a motor truck afterwards is not difficult.

If you are interested in an analysis of your transportation system—no matter how large or how small it may be—write today for information.

The service rendered by this bureau is without charge to you.

AMERICAN LOCOMOTIVE COMPANY, - 1896 Broadway, NEW YORK
Builders also of Alco 6-cylinder and 4-cylinder Motor Cars and Alco Taxicabs

Chicago Branch: 2501 Michigan Avenue
Boston Branch: 567 Boylston Street

Canadian Headquarters:
305 St., Catharine St. West, Montreal

Movers of the World's Goods Since 1835

Capital, $50,000,000

The COMMERCIAL VEHICLE, Inc., 243-249 West 39th St., NEW YORK

Polarine

Starting up 20 mile grade, Wasatch Range of the Rocky Mountains

PREMIER MOTOR MFG CO.

Indianapolis, Ind., Aug 30, 1911.

Standard Oil Company,
555 West 25th Street, New York.

Gentlemen—On the recent Ocean to Ocean run of the Motor Tourists, Polarine Oil, Polarine Transmission Lubricants and Polarine Greases were used on all the cars.

The lubrication of Polarine was ideal.

While we carried large African water-bags to supply water for our radiators in the event of overheating in the steady climbs and steep grades of the Rockies, Sierra Nevadas and the coast ranges west of Omaha, they were practically unnecessary

A heated motor was almost unknown. There was also notable freedom from carbon deposit Furthermore, the stops where Polarine could be obtained were so numerous that at no time were we embarrassed in purchasing supplies.

The Polarine Transmission Lubricants and Greases rendered equally satisfactory service.

We had no trouble in getting gasoline. Moreover, the quality was so uniform that our Premier motors never showed the slightest variation in running.

Considering that seven mountain ranges and the seemingly unlimited prairies, plateaus and deserts of the West were crossed, our average of 12½ miles to a gallon of Standard Gasoline is most remarkable

This is told you in the hope it may encourage other autoists to enjoy, as we have enjoyed, an Ocean to Ocean tour.

Very truly yours,

J. G. MONIHAN,
Secretary Motor Tourists.

Polarine

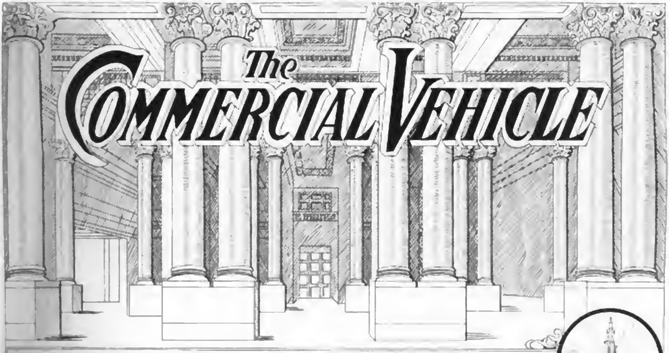
Stands up under
the severest test.

**Are You Using
Polarine on Your Car?**

Send to our nearest agency for "Polarine Pointers." It contains useful hints on the care of motor cars.

Standard Oil Company

Vol. VII January, 1912 No. 1



New York Opens the Big Shows

WHEN the doors of Grand Central Palace, in New York City, are thrown open to the public on January 10, this will usher in the national show season of 1912, although it will have been preceded by other displays, one without commercial vehicles on display and another hardly large enough to be dignified as national. The first exhibition to open its doors was the Buffalo one, December 30 to January 6, but at this the commercial car firms or agents to take space were few and far between. Next in order of precedence came the Importers' Salon, occupying the Hotel Astor from January 2 to 10, inclusive. This small but very select display was not scheduled to include any motor trucks, although several of the exhibiting firms import one or more. The Madison Square Garden exhibition, the largest and strongest in point of numbers and prestige, follows this, but its first week is devoted entirely to the pleasure vehicle, so that the power wagon department does not come into the limelight until January 15.

This gives the Palace show, insofar as commercial cars are concerned, the position of being the first to open, its dates being January 10 to 17. With this in full blast, the national displays may be said to have started fairly, while the show circuit, if it may be called that, is well under way. Some idea of the extent of this may be gained by considering Buffalo as the real leader and Ottawa the tailender. This makes a continuous performance, or almost so, one following right back of the other and in some cases overlapping, as in the case of Salon, first week of the Garden and Palace, all three of which are open on January 10. The whole totals 3.5 months of exhibitions at which commercials may be seen.

During this entire period, with the possible exception of the first week of the Automobile Board of Trade and National Association of Automobile Manufacturers at Chicago, each and every show will include more or less of the commercial element. As a matter of fact, the sentiment in this direction has surprised even the management of the various displays.

In turn, this leads to the wide-spread attention which is being given the commercial vehicle by merchants the country over. One prominent editor connected with a big national weekly has just stated, after a return from a tour of the entire West, that the whole country is talking motor trucks, while the heads of all business houses are making this subject their chief topic of conversation.

To what extent different trades are adopting motor trucks and delivery wagons is a matter largely of speculation because complete statistics are not available. The subject is one of considerable interest and some importance, however. Several of the leading truck manufacturing companies have classified the trades in which the users of their machines are engaged and have tabulated the results. From this work it is learned that one Detroit maker has sold three-ton trucks and a few 1,500-pound wagons for use in 125 different lines of business. In this case it developed that breweries headed the list of users, with express and transfer companies second in number, grocers third, packers and department stores tied for fourth place, and furniture companies and storage warehouse and van companies tied for fifth place.

Some useful data along this line has been compiled from information relating to the classes of attendants at last winter's exhibitions of motor trucks and delivery wagons at the national automobile shows. Cards left by more than 1,500 visitors to Part II of Madison Square Garden in New York, and about 1,800 visitors to the Commercial Vehicle section of the Chicago display were preserved and have been tabulated according to lines of

POSTER ADVERTISING THE PALACE SHOW

THIS YEAR'S GARDEN ORIENTAL SHOW GIRL

business. The classification was made very broad so as to include in each division all manufacturers, wholesalers and retail dealers engaged in similar or closely allied lines.

Each of 50 distinct lines of business was represented by cards left by more than 10 visitors to the shows. The building and contracting business led by a large proportion, equal to 7.7 per cent. of the whole attendance. Manufacturers of metal goods were represented by 6.1; lumbering companies and retail yards by six; canners, manufacturers of foodstuffs, wholesalers and retail grocers by six; printers and publishers by 5.1; machinery makers by 4.6 and general merchandisers or department stores by 3.5.

Some idea of the great gain which has been made and is being duplicated constantly all over the country, may be gained from the statement that Chicago alone gained more than 63 per cent. in numbers during the half year from May to November. Some of the smaller cities are doing fully as well, as, for instance, Los Angeles was considered about three months ago to have 70 vehicles of all kinds in use. While this was doubtless an Eastern estimate and very rough at that, the actual figures just received from a special correspondent of the COMMERCIAL VEHICLE in that city are 754, of which 365 are of 1.5 tons or heavier. These hardly can be translated into percentages of increase, but indicate, nevertheless, how the industry is growing by leaps and bounds.

Such being the case, there is little doubt that the power wagon portions of the shows now open, about to commence, and those which will be ready for inspection in the near future, will have a greater, more permanent and lasting interest and influence for good than has been the case in other previous years.

To give this showgoing public its money's worth, not alone of vehicles in all the possible sizes from a 300-pound package tricar to a 10-ton truck or larger, in all the variety of shapes of body and finish, and in every kind of mechanical detail and refinement, but in pleasant setting as well, the halls everywhere have been dressed for the occasion. The Palace forms a notable exception, but in this case the very newness and richness of the structure forbids much external addition without detracting from its natural beauty and dignity.

In leasing this building the management of the show secured quarters that in beauty, area of floor space, convenience and safety are an improvement upon any exhibition building heretofore existing in New York City. As a matter of sentiment for its associations, everybody will regret the passing of Madison Square Garden next February, when the work of its demolition will be begun, but as a matter of fact the annual automobile show outgrew the building several years ago, so that the holding of two shows in the metropolis became necessary.

EXTERIOR OF THE NEW PALACE VIEWED FROM 45TH STREET

The new Palace will be in itself a strong attraction at show time because of its beauty and novelty. Located only a few blocks north of the New York Central station, it fronts on Lexington avenue, between 46th and 47th streets, and rises to a height of 13 stories. It occupies a block 200 by 275 feet, and is of gray stone and brick construction, with a steel skeleton. The cost of the building was nearly $1,750,000, and of the ground on which it stands almost as much more.

All of the first three floors are designed and reserved for exhibition purposes. They afford a floor area four times greater than the main floor of Madison Square. The combined area is about 126,000 square feet, or more than 27 acres. All of this space will be utilized for the coming automobile and truck show.

Although located on three levels, the exhibition hall has been so treated architecturally as to have the aspect of a spacious amphitheatre. Near the center a large court rises to a height of 40 feet, through the second and third levels. This opening is 136 by 104 feet in the second floor and 85 by 40 feet in the third. An ornamental balustrade surrounding the court on the second floor, together with the massive columns that rise to the third level, give the effect of a mezzanine gallery. Two main colonnades of majestic Corinthian columns grouped in pairs extend across the court, leaving two main unobstructed exhibition areas, 137 by 40 feet, and a third similar area 115 by 40 feet.

A grand marble stairway 60 feet wide, built in three terraces, leads from the entrance on Lexington avenue to the main floor. From the head of this stairway there is a vista of 190 feet between the columns to the great windows at the rear of the building. A distance of 11 feet between the columns makes a wide aisle that will form the center promenade at the automobile show. There are four stairways at or near the corners of the hall which lead to the mezzanine and third floors. These are enclosed by fire walls and metal doors. Fire hazard is reduced to a minimum by the elimination of all wood from the interior construction except the floor, which simply has a hardwood layer over concrete. Window sills are all of metal.

Thus far the list of makers whose names have been given previously on these pages (December issue) include 32 of complete commercial cars, these being placed on the mezzanine floor, and about 50 accessory companies segregated on the third level. While the majority of these machines will be of the gasoline type, several electrics may be seen. A large portion of the companies are new in this field or else new at any show.

Great efforts to draw the people have been made by means of advertising, publicity and in other ways. It seems morally certain now that some 50,000 large business houses throughout the country will be represented at the Palace display by one or more men. As each and every one of these firms is in a receptive mood toward the commercial vehicle, it is reasonable to assume that a large amount of permanent business will be done there, particularly in view of the excellence of the trucks exhibited.

On the previous pages some illustrations have been presented of the various buildings. The frontispiece depicts the interior of the new building as it will be seen from the head of the grand stairway, while the small insert at the lower right-hand corner shows the historic Garden soon to be demolished. The second page presents the posters of the two exhibitions, to both of which considerable significance is attached. That of the earliest shows was painted by A. T. Merrick, and pictures a manly youth at the wheel of a car. The goggles are pushed up onto the forehead and their ends prolonged in such a way as to blend off into the wings, representing speed. The whole is attractively done in colors, but not more so than the Garden poster at the right. The latter carries out the Oriental effect which will permeate the decorations this year. The central figure is that of an Eastern beauty, adorned with the customary jewelry and holding in her outstretched hands a pleasure and a commercial car. This is the work of Jean Paleologue, better known as Pal, who is also the creator of former poster building. The cut below these shows the Palace as viewed from the downtown side, which does not, however, bring out its architectural beauty to advantage.

Opposite this, above, will be found two interiors of the latter building, depicting respectively the main floor at the left and the second floor looking toward the court at the right. The latter view is the location of the greater number of commercial vehicles.

The committee photographs on the next page are self-explanatory, as are also the views of the Garden decorated ready for occupancy and the artist and modeler at work on the paintings and sculpture. The scheme of decoration is very unusual as well as exceedingly beautiful. For one thing, the exhibition hall has a new and different treatment. This will have its walls entirely covered with paintings, the effect being that of an old

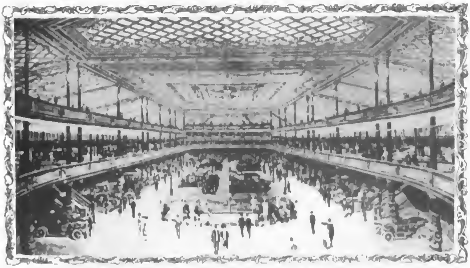
INTERIOR OF THE NEW GRAND CENTRAL PALACE; AT LEFT, THE MAIN FLOOR; AT RIGHT, SECOND LEVEL LOOKING TOWARD COURT

SHOW COMMITTEE OF NATIONAL ASSOCIATION OF AUTOMOBILE MANUFACTURERS OF WHICH H. O. SMITH IS CHAIRMAN AND S. A. MILES, SHOW MANAGER

landscape scene of lower California with its quaint arches, monastery bells, cactus plants and prairies. The architecture will be of Spanish design as introduced in this country in the 16th century. The scenes can be viewed by the visitors through arches which will form a part of the gigantic pergola topped with vines, which will be entwined about the pillars that support it.

The center of the room will be open, giving it an outdoor effect with a sky overhead. Ornate lamps will dangle amid the foliage, but the most notable thing about the central area will be the canopy or rug which will cover the entire ceiling, with smaller fabrics for the sides and ends. The former will be the largest single piece of fabric ever woven together and will weigh, so it is said, three tons. In the center panel is a large allegorical painting representing the triumph of industry. Several thousand feet of floral garlands are to be draped in graceful borders about the panels, and the management is sanguine that it will be pronounced one of the most remarkable art pieces ever seen.

An attempt has been made by the committee in charge of the Garden show to remove or conceal the familiar lines of the amphitheatre's interior by converting it into a definite picture, which itself becomes the frame for the exhibits. While the work of doing this becomes more difficult each year, the genius of those to whom it falls seems to rise to the occasion. For the show of 1912 cars the pictorial idea is that of a mammoth Oriental garden. The color scheme is crim-



INTERIOR OF THE GARDEN DISPLAY AS IT WILL APPEAR ON THE OPENING NIGHT FROM AN ARTIST'S SKETCH. NOTE FAMOUS RUG ON CEILING

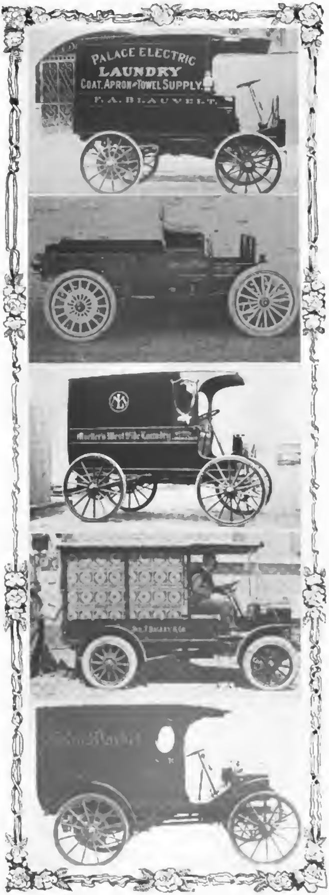
SHOW COMMITTEE OF NATIONAL AUTOMOBILE SHOW TO BE HELD IN MADISON SQUARE GARDEN, OF WHICH COL. GEO. POPE IS CHAIRMAN AND M. L. DOWNS, SECRETARY

son and gold with smatterings here and there of other tints.

A feature of the second week of this display will be the newcomers, these including a number of old, established firms which have just begun to appreciate the magnitude of this end of the industry to the extent of producing a vehicle. In this list is noted Locomobile with a five-ton truck, Lozier with a four, Pope-Hartford showing a 6,000-pound carrier, Speedwell with new four and six-ton trucks which have not been seen in the Garden before, although shown at Boston last year and G-M-C and Bronx electrics. All told there will be approximately 100 different chassis on view, and it is expected that the presence of these newcomers together with the possibility of changes and radical alterations in some older cars, will keep the automobile engineers and those in the trade busy for the entire week looking up every possible point no matter how insignificant. During the shows there will be very many other attractions for out-of-town visitors in the way of banquets, dinners, organization meetings and engineering conventions. Among these may be mentioned: The annual meeting of the Motor and Accessory Manufacturers at the Waldorf-Astoria, Jan. 8, and the banquet of the same association at the same place the evening of Jan. 11; Society of Automobile Engineers meeting at the Automobile Club of America, Jan. 9, and annual meeting in the assembly hall of the Garden, Jan. 18 to 20; several American Automobile Association meetings; the Automobile Board of Trade banquet, the Aero Club dinner on Jan. 17 and others.

PREPARING FOR THE BIG GARDEN SHOW: AT LEFT, PHILIP MARTINY, ITALIAN SCULPTOR, AT WORK; RIGHT, PAL, PAINTING CALIFORNIA SCENE

Complete Specifications of the American Cars for 1912



Cortland 1500-Pound Delivery Wagon with Panel Body
Lincoln, Another 1500-Pound Unit from Chicago
Mercury, a 1000-Pound Carrier Also from the Windy City
Sampson's 1000-Pound Delivery Handling Tobacco
Sullivan, a 1500-Pound Wagon from Rochester

EACH year, in the January issue, the COMMERCIAL VEHICLE presents for its readers the specifications of all the cars on the American market for that year, these figures being compiled with great care and much accuracy from data supplied by the manufacturers themselves on specially prepared blanks. Since the latter have to be sent out several months previously, and each one checked, followed up and kept track of until the desired figures appear, the whole represents a large amount of fine work. These figures are presented on the following pages, and are as complete as possibly can be obtained. It will be noted even that a few concerns have been included which are now going through some sort of internal trouble. These were put in for the sake of completeness, the idea being that they would pass through the present difficulties and again place their product on the market later in the year.

This opportunity is taken of stating that there is no connection between the shows and these figures; the firms which do not exhibit and those present at nearly all displays being given without distinction. The intention was to present to the prospective buyer a complete list from which to make an intelligent choice. To carry this out to the limit a large amount of information is given, much of which might not seem useful at first sight. Later investigation of the problem of purchasing a power wagon would call for still further information on the subject, and this chance is taken to state that a great amount of additional facts and figures relative to these cars is in the possession of this office, and will be supplied with promptness and accuracy to such firms as hesitate to consult an engineer or a firm selling vehicles.

A slight departure is made from the methods of previous years in the arrangement of the matter, the present system permitting of the inclusion of more material in a less space. This was done to give readers

NAMES AND LOCATION OF CAR MAKERS

New Era	**New Era Auto Cycle Co.**	**Dayton, O.**
Maxim	**G. H. Bushnell Press Co.**	**Tom'nville, Ct.**
Reo	**Reo Motor Car Co.**	**Lansing, Mich.**
Auburn	**Auburn Motor Chassis Co.**	**Auburn, Ind.**
Brush	**Brush Runabout Co.**	**Detroit.**
Duryea	**Duryea Auto Co.**	**Saginaw, Mich.**
Kearns	**Kearns Motor Car Co.**	**Beavertown, Pa**
Best	**Durant-Dort Carriage Co.**	**Flint, Mich.**
Chi. Bus.	**Chicago Business Car Co.**	**Chicago.**
Detroit	**Motor Wagon Co. of Detroit**	**Detroit.**
Lincoln	**Lincoln Motor Car Works**	**Chicago**
McIntyre	**W. H. McIntyre Co.**	**Auburn, Ind.**
Overland	**Willys-Overland Co.**	**Toledo.**
Acorn	**Acorn Motor Car Co.**	**Cincinnati.**
Beyster	**Beyster-Detroit M. C. Co.**	**Detroit.**
Blacker	**John H. Blacker & Co.**	**Chillicothe, O.**
Board	**B. F. Board M. T. Co.**	**Alexandria, Va.**

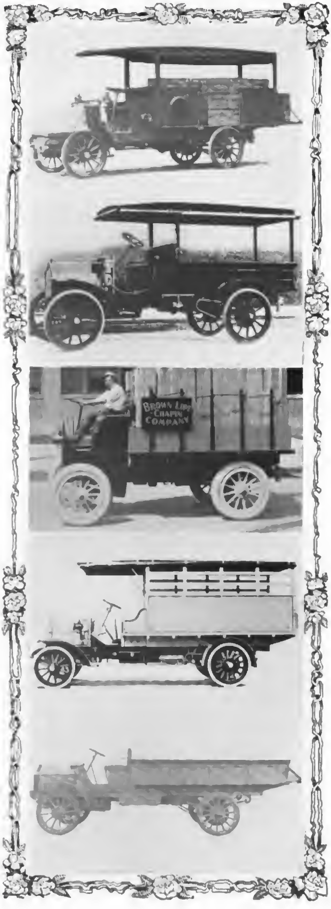
with the Prominent Tendencies of Design and Construction

other than interested merchants and business houses their usual quota of reading matter, including all regular departments.

With the idea of rendering the tables of considerably greater utility to the man hesitating over a choice, there will be given some of the developments of the past year in the line of mechanical changes, improvements and additions. This will be decidedly impersonal, no car names being mentioned, but it is believed that the best interests of the industry will be served by pointing out in this manner the points wherein the vehicles of 1912 are superior to those of the preceding year.

Aside from the general refinements which each year brings forth and which may be expected on practically all cars, some vague driftings of previous years have crystallized under the impulse of greatly increased volume of business into distinct tendencies, as, for instance, shaft drive for the majority of small cars and chains for the larger vehicles. Again, the matter of economy of chassis time has been brought to the front, discussed largely and some results produced. It is now conceded generally that anything which tends to keep the vehicle out on the road a larger portion of the time and minimize loading and unloading losses is beneficial, whether it be a special body, alterations in the driver's habits or position on the car, a different method of loading or something else.

Despite this statement, the driver has been given more consideration than ever before, both in the matter of reducing his actual labor and in simplifying the control of the truck so that it would be possible to utilize previous horse drivers. Strange as it may seem, merchants state that the best results are obtained from well-trained horse drivers, familiar with traffic and delivery conditions rather than from more skilled and knowing chaffeurs who are not familiar with the work of delivery and the regulation of city traffic. It has been



Adams, a Neat One-Ton Truck Hailing from Ohio
Modern 1500-Pound Truck from Bowling Green, Ohio
Franklin's One-Ton Carrier with a Capacity Load
G-M-C, 4000-Pound Delivery Wagon, Formerly Rapid
Indiana One-Ton Truck, a Hoosier Newcomer

NAMES AND LOCATION OF CAR MAKERS

Buick	Buick Motor Co.	Flint, Mich.
Champion	C. F. Megow Co.	Milwaukee.
Cino	Haberer & Co.	Cincinnati.
Economy	Economy Motor Car Co.	Joliet, Ill.
Geneva	Geneva Wagon Co.	Geneva, N. Y.
Gleason	Kansas City Vehicle Co.	Kan. City, Mo.
Hatfield	Hatfield Co.	Elmira, N. Y.
Int'l	International Harvester Co.	Chicago.
Jonz	American Auto. Mfg. Co.	N. Albany, Ind.
Lambert	Buckeye Manufacturing Co.	Anderson, Ind.
Mercury	Mercury Manufacturing Co.	Chicago.
Merit	Waterville Tractor Co.	Waterville, O.
Modern	Bowling Green M. C. Co.	B'lingGreen, O.
Regal	Regal Motor Car Co.	Detroit.
Rogers	Rogers Motor Car Co.	Omaha.
Schmidt	Schmidt Bros. Co.	Gr. Cross., Chi.
Sullivan	Sullivan Motor Car Co.	R'chester, N.Y.

Detailed Specifications of All Commercial

CAR	BODY										POWER PLANT							
	Capacity	Length	Width	Overall Length	Overall Width	Wheelbase	Tread	Weight Chassis	Maximum Speed	Driver's Seat	Number Cylinders	How Cast	Bore	Stroke	Power	Carburetion	Ignition	Lubrication
Up to 1,000 Pounds :																		
New Era*	400	48	28	116	58	72	50	450	35	Above	1		3.6	3.7	6.0	Float Feed	Delco	Splash
Maxim*	500	39	36	125	55	90	47	600	25	Behind	2	Sep	4.2	4.5	8.5	Own	Magneto	Splash
Reo	500	72	48			78	60	1,100	20	Above	1		4.7	6.0	12.0	Own	Jump Spark	Force Feed
Auburn	600	46	27	103	56	77	56	1,100	16	Above	2	Sep	4.1	3.7	13.6	Float Feed	Jump Spark	Force Feed
Brush	600	51	37	121	61	88	54	1,375	24	Behind	1		4.0	5.0	10.0	Kingston	Bosch	Force Feed
Duryea	600	65	36	126	56	84	56	850	20		2	Sep	3.7	3.7	12.0	Hestger	Jump Spark	With Fuel
Kearns	800					100	56	1,225	30	Behind	3	Sep	4.0	4.0	20.0	Schebler	Unisparker	
Best	800	63	40	116		76	56		18	Above	2	Sep	4.5	4.5	12.0	Kingston	Dual	Pump
Chicago Bus	800	59	40	125		87	56	1,100	21	Above	2	Sep	4.1	4.0	14.0	Float Feed	Jump Spark	Spl & Pump
Detroit	800	66	44	132	62	100	56	1,770	35	Behind	2	Sep	4.0	4.0	16.0	Float Feed	Bosch	Force Feed
Lincoln	800	38	72	144	65	87	56	1,200	20	Above	2	Block	4.1	4.0	14.0	Schebler	Jump Spark	Force Feed
McIntyre	800									Behind	2	Sep	4.1	3.7	13.6	Float Feed	Jump Spark	Force Feed
Overland	800	44	42	146		106	56		15	Behind	4	Sep	4.0	4.5	30.0	Schebler	Splitdorf	Force Feed
Acorn	1,000	79	44	136	64	96	56	1,900	20	Above	2	Sep	5.0	4.0	20.0	Schebler	Jump Spark	Force Feed
Beyster	1,000	72	42	110	60	106	56	1,800	20	Behind	4	Block	3.5	5.0	20.0	Float Feed	Bosch	Splash
Blacker	1,000					86	56	1,300	15	Behind	2	Sep	4.0	4.0	11.0	Schebler	Battery	Splash
Board	1,000	78	48	168	62	110	56			Behind	4	Block	3.7	5.2	28.0	Schebler	Bosch	Force Feed
Buick	1,000	76	42	139	70	92	56	2,200	30	Above	2	Sep	3.5	5.0	22.0	Schebler	Remy	Force Feed
Champion	1,000	132	60	168	68	124	58	4,000	15	Above	4	Pairs	4.2	5.0	35.0	Float Feed	Simms	Force Feed
Cino	1,000	63	36	157	66	113	56		35	Behind	4	Pairs	4.3	5.0	40.0	Stromberg	Remy	Spl & Pump
Economy	1,000	84	45		64	100	56	1,650		Above	2	Sep	4.5	5.0	20.0	Schebler	Magneto	Force Feed
Geneva	1,000	58	45	144	60	96	56	1,915	18	Behind	2	Sep	5.2	1.5	20.0	Schebler	Bosch	Force Feed
Gleason	1,000	71	48	96	32	78	32	1,400	30	Front	2	Sep	4.0	4.7	20.0	Schebler	Remy	Force Feed
Hatfield	1,000	67	42	108	36	90	56	1,800	20	Side	3‡	Sep	4.1	4.0	20.0	Holley	Bosch	With Fuel
International	1,000					84	56				2	Sep	5.0	4.0	14.0	Schebler	Bosch	Mechanical
Jonz	1,000	54	36			96	56	1,500	20	Behind	3	Sep	3.7	4.2	22.0	Schebler	Bosch	Force Feed
Lambert	1,000					100	56	2,200	18	Behind	2	Sep	5.2	4.0	20.0	Schebler	Remy	Pump
Mercury	1,000	72	40	108	68	85	56	1,500	15	Above	2	Sep	4.2	4.0	14.0	Own	Battery	Spl & F. F.
Merit	1,000	77	42	153	69	88	56	1,770	15	Above	2	Sep	4.7	4.7	18.0	Schebler	Jump Spark	Spl & F. F.
Modern B	1,000	72	42			110	56	1,810	25	Behind	4	Block	3.7	4.5	22.0	Float	Eisemann	Spl & F. F.
Regal LB	1,000	58	42	154	63	107	56	2,300	35	Behind	4	Pairs	4.1	4.0	30.0	Float	Michigan	Spl & Pump
Rogers	1,000	60	48	142	68	100	56	1,600	18	Behind	2	Sep	4.7	4.0	18.0	Kingston	Bosch	Force Feed
Schmidt	1,000	84	42	144	66	90	56	2,000	20		2	Sep	4.7	4.7	18.0	Schebler	Simms	Spl & F. F.
Sullivan	1,000	60	38	141	65	92	56	1,700	18	Behind	2	Sep	4.5	4.5	18.0	Schebler	Bosch	Force Feed
Van Dyke	1,000	72	39	126	72	86	56	1,410	20	Side	2	Sep	4.5	6.0	22.0	Schebler	Magneto	Mechanical
Warren	1,000	64	43	150	59	110	56		35	Behind	4	Block	4.0	4.5	30.0	Float Feed	Bosch	Spl & Pump
1,001 to 2,000 Pounds :																		
Auburn	1,200	68	45			86	56	1,800	16	Above	2	Sep	4.7	4.7	20.0	Float Feed	Remy	Force Feed
Siebert	1,250					100	56.5	1,900	18	Behind	2	Sep	5.0	4.0	20.0	Carter	Simms	Splash
Atlas	1,500	90	44	144	72	102	56	1,800	25	Behind	2	Pairs	4.5	4.5	20.0	Float Feed	Atw't'r Kent	With Fuel
Cartercar	1,500	71	44	138	66	98	56	2,000	22	Above	2	Sep	4.5	5.0	18.0	Schebler	Remy	Mechanical
Chase D	1,500	72	44	144	66	100	58		15	Behind	3‡	Sep	4.1	4.0	20.0	Holley	Bosch	With Fuel
Coleman	1,500	84	42	144		100	56	2,000	15	Above	2‡	Sep	4.5	4.5	20.0	Float Feed	I. W.	With Fuel
Cortland	1,500	75	42			84	56	1,700	16	Above	2	Sep	4.2	4.2	16.0	Breeze	Remy	Force Feed
Crown	1,500	84	44	168		104	56.5	2,100	18	Behind	4	Sep	3.7	4.5	26.0	Schebler	Remy	Mechanical
Dart	1,500	78	42	123	64	80	56	1,350	18	Above	2	Sep	4.2	5.0	16.0	Float Feed	Splitdorf	Force Feed
Denniston	1,500	84	48	136	46	96	56	2,000	22	Above	2	Block	4.0	4.7	15.0	Float Feed	Bosch	Spl & Pump
Gaylord	1,500	66	32	150	63	112	56	2,000	30	Behind	4	Pairs	4.0	5.0	30.0	Schebler	Remy	Force Feed
Ideal	1,500	96	41	153	68	109	56	2,100	18	Above	4	Pairs	3.5	4.2	24.0	Float Feed	Bosch	Spl & F F
Johnson	1,500	102	46	147	80	112	56		16	Above	4	Pairs	4.5	5.2	40.0	Stromberg	Optional	Splash
Kearns	1,500	72	48	136	64	100	56	1,100		Behind	3‡	Sep	4.0	4.0	20.0	Schebler	Unisparker	With Fuel
Kisselkar	1,500	81	44			120	56	2,500	35	Behind	4	Pairs	4.2	4.2	30.0	Stromberg	Bosch	Splash
Lincoln	1,500	72	38	144	65	87	56	1,200	20	Above	2	Block	4.1	4.0	14.0	Schebler	Jump Spark	Force Feed
Lippard-Stewart	1,500	72	45	162	70	115	56	2,200	25	Behind	4	Block	3.3	4.3	20.0	Float Feed	Bosch	Pump
McIntyre	1,500	68	45			96	56	2,000	17	Behind	2	Sep	5.2	4.0	22.5	Float Feed	Briggs	Splash
Maytag-Mason	1,500	50	40					850	30	Above	2	Sep	5.0	5.0	20.0	Schebler	Jump Spark	Spl & F F
Menominee	1,500	78	42	163	69	112	56	2,250	20	Behind	4	Pairs	4.7	4.5	25.0	Schebler	Eisemann	Pump
Modern	1,500	78	42			114	56		20	Behind	4	Block	4.5	5.0	30.0	Float Feed	Jump Spark	Spl & F F
Monitor	1,500	86	43	121	60	100	56	2,200	25	Above	4	Sep	5.0	4.0	20.0	Schebler	Dual	Force Feed
Mora	1,500	80	45	150	69	94	56	2,100	20	Behind	2	Sep	4.5	4.5	16.0	Float Feed	Magneto	Force Feed
Oliver	1,500	72	44			100	56	2,500	18	Behind	2	Sep	5.0	1.0	24.0	Float Feed	Mea	Force Feed
Philadelphia	1,500	84	52			112	56	2,063	25	Above	4	Pairs	3.6	4.7	25.0	Schebler	Bosch	Splash
P H P	1,500	84	38			102	56	2,000	25	Side	4	Block	4.0	4.5	10.0	Float Feed	Splitdorf	Spl & F F
Reo	1,500	84	45	144		90	60	1,550	14	Above	1		4.7	6.0	12.0	Own	Jump Spark	Spl & F F
Sampson	1,500	72	43	142	68	94	56	2,000	20	Behind	2	Sep	4.7	4.7	18.0	Float Feed	Jump Spark	Spl & F F
Schacht	1,500	60	40	158	64	120	56	2,300	45	Behind	4	Block	4.3	5.0	10.0	Schebler	Mea	Spl & Pump
Sullivan	1,500	72	42	150	63	110	56	1,800	18	Behind	2	Sep	4.5	4.5	18.0	Schebler	Jump Spark	Force Feed
Veerac	1,500	85	41	138	68	82	56	1,700	18	Above	2	Sep	4.0	4.0	20.0	Holley	Jump Spark	With Fuel
Victor	1,500	81	42			101	56				4		3.7	4.5	21.0	Schebler	Bosch	Spl & F F
Webster	1,500	60	35	132	40	93	56		20	Behind	2	Block	4.5	4.0	16.0	Schebler		Force Feed
White	1,500	80	50	170	72	120	56	2,535	30	Behind	4	Block	3.7	5.1	30.0	Own	Bosch	Spl & F F
Whitesides	1,500	150				118	56				4	Block	4.5	4.5	30.0	Marvel	Splitdorf	Splash
Willet	1,500	81	40			110	56	2,300	17	Above	3‡	Sep	4.1	4.5	30.0	Float Feed	Mea	Force Feed
Adams	2,000	106	46	200	70	121	56	3,200	15	Behind	4	Block	3.8	5.0	30.0	Kingston	Eisemann	Spl. & F F
Atterbury	2,000	96	48			125	56	3,000	20	Behind	4	Block	4.0	4.5	25.6	Schebler	Bosch	Spl & F F
Bessemer	2,000	80	48	160	64	105	56	2,100	18	Behind	4	Block	4.7	5.2	20.0	Stromberg	Bosch	Force Feed
Blacker	2,000					98	50.5	2,700	12	Above	4	Pairs	4.1	5.2	24.0	Special	Bosch	Splash
Board	2,000	96	48	183	62	120	56		18	Behind	4	Block	4.1	5.2	32.0	Schebler	Bosch	Force Feed
Cass	2,000	90	64	192	72	116	56	3,200	16	Behind	4	Block	4.0	4.5	30.0	Kingston	Bosch	Pump
Chase	2,000	82	44	156	75	106	58		15	Behind	3‡	Sep	4.1	4.0	20.0	Float Feed	Bosch	With Fuel
Clark	2,000	96	45			102	56	2,000		Above	2	Sep	5.0	1.5	24.0	Schebler	U & H	Force Feed
Clark	2,000	108	48	156	72	100	56	3,000	18	Above	4	Block	3.7	1.0	30.0	Float Feed	Eisemann	Force Feed
Decatur	2,000	112	66			129	56	2,800		Above	4	Sep	4.0	4.0	30.0	Float Feed	Simms	

NOTES: * Tricar † Pull. 3 ton on Trailer ‡ Two cycle ** Four Wheel Drive ¶ Front Drive a To 240

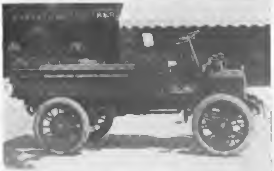
All dimensions are given in the next largest even size. The weight refers to the chassis where this was available, but in some cases the total weight was only given, and this will be found in the table. Bore and Stroke have been given in decimals except for metric sizes; the fractions represented are as follows: 1 represents 1-8, 2 1-4, 3 3-8, 5 5-8, 7 3-4 and 8 7-8. Under carburetion and ignition the make was given where this was available. Under Final Drive Ch

Vehicles on the American Market for 1912

COOLING		TRANSMISSION					TIRES			SPRINGS			BRAKES			
Circulation	Radiator	Clutch	Form	Speeds	Location	Final Drive	Front	Rear	Front Axle	Front	Rear	Steering	Emergency	Service	Frame	Retail Price
Air		Band	Plan	2	With Motor	Ch	26x3	26x3	Tubular	Semi-ell		Own	Exp		Pressed Steel	$ 425
Air			Hydrau		With Motor	Ch	28x2.5	28x2.5			Semi-ell	Own	Hubs	Hub	Tubular Steel	395
Thermo		Disc	Plan	2	With Motor	Ch	29x3.5	29x3.5	Forged	Ell.	Round	Pin	Rever	Hubs	AngleSteel	600
Thermo	H'comb	Disc	Plan	2	Amidships	Chs	30x3	30x3	Wood	Full-ell	Full-ell	Own	Hubs	Hubs	Wood	683
Air		Plate	Plan		With Motor	3 Ch.	34x1.3	34x1.3	D Forged	¾-ell	Full-ell	Own		Trans	Angle Steel	487
Air			Roller		C S	Roller	x1.5	x1.6	Channel	¾-ell	Semi-ell	Own	Hubs		Pressed Steel	500
Air			Friction		Amidships	Chs	36x1.2	36x1.5	Square	Full-ell	Full-ell	Worm	Hubs	Rever	Angle Steel	900
Thermo	F Tube		Friction		Amidship	Chs	32x2	34x2	Square	Semi-ell	Full-ell	Platf	Rever	Hubs	Angle Steel	
Air			Friction			Chs	38x2	38x2	Square	Full-ell	Full-ell	Own	Rever	Hubs	Pressed Steel	
Thermo	Tubular	Disc	Plan	2	At Jackshaft	Chs	32x2	32x2.5	Tubular	Semi-ell	Full-ell	Spur	Hubs	J S	Channel Steel	610a
Air			Friction			Chs	38x2	38x2	Square	Full-ell	Full-ell	Own	Exp	Exp	Pressed Steel	575
Thermo	Tubular	Disc	Plan	2	With Jacksh.	Chs	x1.3	x1.3	Square	Semi-ell	Full-ell	Own	Hubs	Hubs		650
Thermo	Tubular	Cone	Select	3	Rear Axle	Shaft	33x4	33x4	I-beam	Semi-ell.	¾-ell	Worm	Cont	Exp	Pressed Steel	900
Thermo	Tubular		Friction		Amidship	Chs	34x2.5	34x2.5	D Tubular	Full-ell	Full-ell	Own			Steel	
Thermo	H'comb	Plate	Plan	2	Amidship	Chs	x3	3.5	I-beam	Semi-ell	Platf		J S.	Hubs	Channel Steel	1,250
Air		Band	Select	2	Amidship	Ch	30x3	30x3	Tubular	Full-ell	Full-ell	Own		Hubs	Angle Steel	650
Pump	H'comb	Cone	Select	3	Back Motor	Shaft	34x2.5	34x3	I-beam	Semi-ell	Platf	Warn	Cont	Exp	Channel Steel	1,375
Pump	Tubular	Cone	Plan	2	With Motor	Chs	32x4	32x4	I beam	¾-ell	Semi-ell	Pin	Hubs	Hubs	Angle Steel	1,000
Pump	Tubular	Disc	Select	3	Amidship	Chs	36x3.5	36x4	Forged	Semi-ell	Platf	Ross	Hubs	J S	Channel Steel	2,500
Pump	Tubular	M Disc	Select	3	Amidship	Shaft	34x4	34x4	I-beam	Semi-ell	¾-ell	Gemmer	Hubs	Hubs	Pressed Steel	2,000
Pump	H'comb	Cone	Plan	2	Amidship	Chs			Square	Full-ell	Full-ell	Own		Hubs	Angle Steel	
Pump	Tubular	Disc	Plan	2	With Jacksh	Chs	34x2	36x2.5	Solid	Semi-ell	Full-ell	Irrever		Exp	Wood	1,350
Thermo	Tubular	Disc	Select	3	Amidship	Shaft	36x2	36x2	I beam			Worm		Exp	Pressed Steel	1,050
Air			Friction				x2	x2.5		Single	Semi-ell	Own	Cont	Rever	Angle Steel	850
Air		Band	Pat	2	Back Motor	Ch	x1.7	x1.7	Square	Full-ell	Full-ell		Cont	Exp	Wood	
Pump	H'comb	Plate	Select	3	Rear Axle	Shaft	32x3.5	32x3.5	I-beam	Semi-ell	¾-ell	Own	Hubs	Hubs	Pressed Steel	800
Pump	Vertical		Friction		Amidship	Ch	38x2	38x2.3	I beam	Semi-ell	Semi-ell	Rose	Hubs	J S	Channel Steel	1,250
Air		Plate	Plan	2	With Motor	Chs	38x1.7	40x1.7	Square	Full-ell	Full-ell	Own	Trans	Hubs		750
Air		Disc	Friction	4	Amidship	Chs	35x2	35x2	I-beam	Full-ell	Full-ell	Own	Hubs	Hubs	Angle Steel	1,000
Pump		Cone	Select	3	Amidship	Chs	33x4	33x4	I-beam	Semi-ell	Semi-ell	Ross	Hubs	J S	Pressed Steel	1,200
Thermo	Tubular	Cone	Select	3	Rear Axle	Shaft	32x3.5	32x3.5	I-beam	Semi-ell	Full-ell	Own	Hubs	Hubs	Pressed Steel	1,050
Air			Friction		Amidship	Chs	36x2.5	36x3	I beam	Trans	Full-ell	Own	Rever	Hubs	Wood	800
Air		Disc	Plan	2	With Motor	Chs	36x2	38x2	Square	¾-ell	Coil	Ross		Exp	Channel Steel	1,025
Thermo	Tubular	Cone	Plan	2	With Motor	Chs	36x2.5	36x2.5	Square	Full-ell	Full-ell	Col	Trans	Hubs	Angle Steel	1,050
Pump	Tubular		Friction		Amidship	Shaft	32x3	32x3	Tubular	Semi-ell	Platf	Gemmer	Hubs	Hubs	Pressed Steel	850
Pump	Tubular	Cone	Select	3	Amidship	Shaft	32x4	32x4	D I-beam	Semi-ell	¾-ell	Gemmer	Hubs	Hubs	Pressed Steel	1,350

COOLING		TRANSMISSION					TIRES			SPRINGS			BRAKES			
Circulation	Radiator	Clutch	Form	Speeds	Location	Final Drive	Front	Rear	Front Axle	Front	Rear	Steering	Emergency	Service	Frame	Retail Price
Air			Plan	2	With Motor	Chs	34x1.7	34x2		Full-ell	Full-ell	Own	Hubs	Trans	Angle Steel	750
Thermo	Tubular	Plate	Plan	2	With Jacksh	Chs	36x2	36x2.5	Square	¾-ell	Full-ell	Worm	Hubs	J. S	Angle Steel	1,000
Pump	H'comb	Plate	Select	3	With Motor	Shaft	32x4.5	32x4.5	I-beam	Semi-ell	Semi-ell	Gemmer	Hubs	Trans	Pressed Steel	1,750
Thermo	Tubular		Friction		Amidship	Chs	34x2.5	36x2.5	Tubular	Semi-ell	Semi-ell	Own	Rever	Hubs	Pressed Steel	1,250
Air			Plan	2	With Jacksh	Chs	36x2	38x2	I-beam	Full-ell	¾-Platf	Barnes		Band	Wood	900
Pump		Plate	Select	2	Amidship	Chs	x2.5	x2.5	Square	Ell	Ell	Foster	J. S	Hubs	Angle Steel	1,250
Thermo	Tubular	Cone	Plan	2	Amidship	Chs	36x2.5	36x2.5	Square	Full-ell	¾-Platf	Worm	Rever	Hubs	Wood	970
Thermo	Tubular	M Disc	Select	3	Amidship	Chs	36x2.5	36x5	Square	Semi-ell	Full-ell	W. & S	Cont	J. S	Channel Steel	1,200
Thermo	H'comb	Disc	Plan	2	With Motor	Chs	x1.7	x1.7	Square	Full-ell	Full-ell	Own	Exp	J. S	Pressed Steel	650
Pump	H'comb	Plate	Select	3	With Motor	Shaft	32x4	32x4	I-beam	Semi-ell	¾-ell	Worm	Hubs	Trans	Nickel Steel	2,000
Pump	Tubular	Disc	Select	3	Rear Axle	Shaft	32x4	32x4	I beam	Semi-ell	Platf	W & S	Hubs	Hubs	Steel	1,500
Thermo	Tubular	D. & C.	Select	3	With Jacksh	Chs	36x2.5	36x3		¾-ell	¾-ell	Own	Hubs	J S	Wood	1,500
Pump	H'comb	Cone	Select	3	Amidship	Shaft	34x3	34x3	I-beam	Semi-ell	Semi-ell	Own	Hubs	Hubs	Channel Steel	1,600
Air			Friction			Chs	x2	x2	Square	Full-ell	Full-ell	Gemmer	Int.	Ext	Wood	1,150
Pump	H'comb	Cone	Select	3	Amidship	Shaft	35x4.5	35x4.5	I-beam	Semi-ell	Semi-ell		Hubs	Hubs	Pressed Steel	1,750
Air			Friction			Ch	38x2	38x2	Square	Full-ell	Full-ell	Own	Rever	Exp	Pressed Steel	785
Thermo	H'comb	Plate	Select	3	Amidship	Shaft	34x4	34x4	I-beam	Full-ell	Semi-ell	W & S	Hubs	Hubs	Pressed Steel	1,675
Thermo	Tubular	Disc	Plan	2	With Jacksh	Chs	x1.7	x2	Square	Full-ell	Full-ell	Own	Hubs	Hubs	Channel Steel	950
C Pump	Vertical	Cone	Plan	2		Ch	32x3.5	32x3.5	Tubular	Semi-ell	Full-ell	S & N	Hubs		Pressed Steel	
Pump	Tubular	Disc	Select	3	With Motor	Shaft	32x3	32x3	I-beam	Semi-ell	Platf	W & S	Hubs	Hubs	Channel Steel	1,200
Pump		Cone	Select	3	With Jacksh	Chs	36x3	36x3.5	I-beam	Semi-ell	Semi-ell	W & S	Hubs	J S	Pressed Steel	1,600
Pump	H'comb	Cone	Plan	2	Amidship	Shaft	33x2.5	34x3	I-beam	Semi-ell	Full-ell	Ross	Hubs	Cont	Pressed Steel	1,050
Thermo	H'comb	Disc	Plan	2	With Jacksh.	Chs	36x2	36x2.5	Square	Semi-ell	Semi-ell		Exp	Hubs	Pressed Steel	1,000
Thermo	Tubular	Disc	Plan	2	With Motor	Shaft	38x2.5	38x2.5	I-beam	Semi-ell	Semi-ell	Lavigne	Hubs	Sh	Pressed Steel	1,400
Pump		Plate	Select	3	Amidship	Shaft	32x4	32x4	I-beam	Full-ell	Semi-ell	Worm	Hubs	Hubs	Pressed Steel	2,000
Pump	Tubular	Disc	Select	3	With Motor	Shaft	30x4	30x4	I-beam	Semi-ell	Full-ell	Foster	Hubs	Hubs	Pressed Steel	1,050
Thermo	H'comb	Disc	Plan	2	With Motor	Chs	36x2	36x2.5		Semi-ell	Full-ell	Own	Hubs	J S	Pressed Steel	750
Thermo	Tubular	Plate	Select	3	Amidship	Shaft	34x4.5	34x4.5	Square	Semi-ell	¾ Platf	W. & N	Hubs	Hubs	Pressed Steel	
Pump	H'comb	Cone	Select	3	Amidship	Shaft	34x4	34x4	I-beam	Semi-ell	¾-ell	Barnes	Hubs	Hubs	Pressed Steel	1,585
Thermo	Vertical	Cone	Plan	2	With Motor	Chs	36x2.5	36x2.5	Square	Full-ell	Full-ell		Trans	Hubs	Angle Steel	1,000
Air		Disc	Plan	2	With Jacksh	Chs	35x4	35x4	I-beam	1-ell	Full-ell	Foster	Trans	Hubs	Wood & Steel	850
Pump	H'comb	Disc	Select	3		Chs	34x2.5	34x3		Semi-ell	Semi-ell	Worm	Hubs	J S	Channel Steel	1,700
Air			Plan	2	Amidship	Chs	x1.7	x1.7	Square	Semi-ell	Full-ell	Own		Hubs	Wood & Steel	
Pump	H'comb	Cone	Select	4	Amidship	Shaft	34x4	34x3.5	I-beam	Semi-ell	Semi-ell	W & S	Hubs	Hubs	Ch Nick Steel	2,100
Thermo	H'comb	Disc	Plan	2	Amidship	Chs	x2.5	x2.5	I-beam	Full-ell	Full-ell	Ross	Exp	Shaft	Wood & Steel	1,500
Thermo		Plate	Select	3	Amidship	Shaft	34x4.5	34x3.5	I beam	Semi-ell	Semi-ell		Exp	Cont	Pressed Steel	1,800
Pump	Tubular	Disc	Select	3	Amidship	Chs	36x4	36x3.5		Semi-ell	Semi-ell	Detw	Hubs	J S	Pressed Steel	2,100
Pump	Tubular	Plate	Select	3	With Motor	Chs	36x3.5	36x4	I-beam	Semi-ell	Semi-ell	Own	Hubs	Hubs	Pressed Steel	
Thermo	Tubular	Cone	Select	3	With Jacksh	Chs	34x2.5	34x3	I-beam	Semi-ell	Platf	Own	Hubs	J. S	Pressed Steel	1,950
Pump		Band	Select	3	Amidship	Chs	32x4	32x4	C St.	Full-ell	Platf	Ross	Hubs	J S	Channel Steel	2,250
Pump	H'comb	Disc	Select	3	With Jacksh	Chs	36x3.5	36x4	I beam	Semi-ell	Platf	Warner	Exp	Hubs	Rolled Steel	1,975
Thermo		Cone	Slid	2	Amidship	Chs	34x3.5	34x3	Square	Semi-ell	Platf	Ross	Hubs	Hubs	Steel	1,850
Air		Cone	Select	3	With Jacksh	Chs	36x2	38x2.5	Square	Full-ell	¾-Platf	Barnes	Trans	Hubs	Wood & Steel	1,400
Thermo		Cone	Slid	2	Amidship	Chs	36x2.5	36x2.5	Square	Semi-ell	Platf	Ross	Hubs	J. S	Pressed Steel	
Thermo	H'comb	Disc	Select	3	Amidship	Shaft	36x3.5	36x4		Semi-ell	Full-ell	Ross			Pressed Steel	2,000
Pump		Disc	Select	3	Amidship	Chs	32x3	32x3.5	I-beam	Semi-ell	Platf	Ross	Hubs	J S	Channel Steel	1,800

represents single chain and Chs double chain. Under the heading Frame, St stands for steel and the abbreviations P, Tub, A and Ch for Pressed, Tubular, Angle and Channel respectively. The prices will be found to vary in that a number of makers furnished the chassis price, a still larger number the retail selling price and some others the price F O B factory. The abbreviations for electrical vehicles were as follows: Kw, Kilowatt; Ld, Lead; Pl, Plate; Ex, Exide; Eds, Edison; GE, General Electric; V, Volts; Amp., Amperes; Fwd., Forward; Rev., Reverse.



Cass, a Detroit One-Ton Truck of Merit
Hewitt's Smallest Product, a One-Ton Wagon
Mora 1500-Pound Carrier, a New One with an Old Name
Veerac 1500-Pound Delivery Wagon from the Northwest
Warren-Detroit Delivery Wagon, a 1000-Pound Vehicle

found that the latter have larger expectations, are less patient under restraint of slow speeds and delivery waits and in general do not adapt themselves downward, so to speak, from previous pleasure car experience or teachings. The horse driver, on the other hand, moves upward and brings to bear all that he has learned previously; moreover, the very newness of his work and the care of mechanism makes him more ready to learn and consequently easier taught. The latter, too, cost less, an important item in the installation of a fleet of 50 or more cars.

To make all this possible, manufacturers have been obliged to simplify wherever possible the control mechanism, making the intricate and delicate parts more nearly foolproof or enclosing them in plain casings to present an impression of simplicity. This latter, for instance, has developed considerable attention to the use of a fixed sparking point for the magneto, which in turn has been evolved as the best and most successful form of ignition.

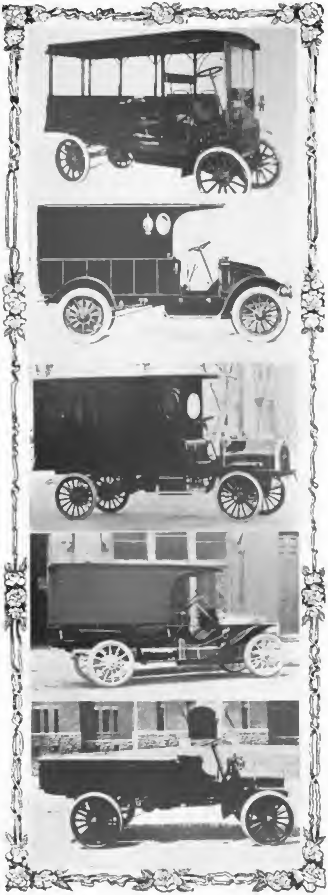
Progress of Self-Starting Devices

Similarly, the work of starting the car by cranking, always a dangerous process, has been considered at some length, the result being that a few vehicles will be equipped in this manner for the coming year, while a much larger number of makers is preparing to apply them during 1913. Despite several notable converts to the driver's location above the motor, the general tendency seems to favor the position back of it, similar to that which is now universal for touring cars. This has come about, too, in the face of really excellent logic for the other form, every weighty argument being in favor of the overhead position.

Engines have shown as much improvement as any one of the other units, this being a natural evolution. While the matter of individual casting of cylinders has lost ground, the paired form for large motors and the block

NAMES AND LOCATION OF CAR MAKERS

Van Dyke	Van Dyke Motor Car Co.	Detroit.
Warren	Warren Motor Car Co.	Detroit.
Siebert	The Shop of Siebert	Toledo.
Atlas	Atlas Motor Car Co.	Sp'gfield, Mass.
Cartercar	Cartercar Co.	Pontiac, Mich.
Chase	Chase Motor Truck Co.	Syracuse.
Coleman	F. Coleman C'r'ge & Har. Co.	Ilion, N. Y.
Cortland	Cortland Motor Wagon Co.	P'tsfield, Mass.
Crown	Crown Commercial Car Co.	N. Milwaukee.
Dart	Dart Manufacturing Co.	Waterloo, Ia.
Denniston	Denniston Co.	Buffalo.
Gaylord	Gaylord Motor Car Co.	Gaylord, Mich.
Ideal	Ideal Auto Co.	Ft. Wayne, Ind.
Johnson	Johnson Service Co.	Milwaukee.
Kissel Kar	Kissel Motor Car Co.	Hartford, Wis.
Lippard-Stewart	Lippard-Stewart M. C. Co.	Buffalo, N. Y.
Maytag-Mason	Maytag-Mason Motor Co.	Waterloo, Ia.



Ideal 2000-Pound Carrier, an Indiana Product
Lippard-Stewart, a New 1500-Pound Carrier
McIntyre Delivery Wagon, of 1500 Pounds Capacity
Menominee, a Northwestern Newcomer for 1500 Pounds
Chase, an Air-Cooled 1500-Pound Delivery Wagon

type for the smaller units has gained rapidly. With reference to the latter, it almost might be said that every small four-cylinder power plant developed in the past couple of years has been of this type. No less than 50 of these are found in the accompanying tables, of which 27 are listed between 1,500 and 2,000 pounds carrying capacity. As compared with last year, the number is almost tripled, while the year before that (1910) showed few, if any.

Materials have undergone little change, the most noticeable one being the substitution of cheaper metals for the lower half of the crankcase as a matter of simple economy, and in some cases for the upper part in the interest of safety. In the usual instance, the top portion carries the bearings, cylinders and other parts, thus acting as the principal support for these important parts. With this form the lower half becomes but an oil container and dust cover, doing no other useful work. Both of these statements being true, it is evident that the arms on the first must be strong and reliable, which cannot be said unreservedly of aluminum castings, while the second can be of any material so long as the shape is right. A number of firms have tried malleable iron, cast steel, bronze and other metals for the upper part, while the lower seems to work well in pressed steel. The latter involves a high cost for dies, but beyond that the individual parts may be turned out cheaply.

Slide and Sleeve Valves Not Used

Valves and valve motions have undergone little if any change beyond the attempt to silence them by inclosure, superior design and lubrication and otherwise. As to the slide and sleeve valves which have made such progress on the pleasure type of car, these have not been applied to any American trucks as yet. Although there are four licensees in this country under the Knight patents, but two of these are producing commercial cars, and neither one of these in any quantity.

NAMES AND LOCATION OF CAR MAKERS

Menominee	**D. F. Poyer & Co.**	**Menominee.**
Monitor	**Monitor Auto Works**	**Janesville, Wis.**
Mora	**Mora Power Wagon Co.**	**Cleveland.**
Oliver	**Oliver Motor Car Co.**	**Detroit.**
Philadelphia	**Standard Gas & Elec. P. Co.**	**Philadelphia.**
P H P	**P. H. P. Motor Truck Co.**	**W'tfield, Mass.**
Sampson	**Alden Sampson Mfg. Co.**	**Detroit.**
Schacht	**Schacht Motor Car Co.**	**Cincinnati.**
Veerac	**Veerac Motor Co.**	**Anoka, Minn.**
Victor	**Victor Motor Truck Co.**	**Buffalo.**
Webster	**Chicago Coach & C'r'ge Co.**	**Chicago.**
White	**White Co.**	**Cleveland.**
Whitesides	**Whitesides Com. Car Co.**	**Newcastle, Ind.**
Willet	**Willet Engine & Carb'r Co.**	**Buffalo.**
Adams	**Adams Bros. Co.**	**Findlay, O.**
Atterbury	**Atterbury Motor Car Co.**	**Buffalo.**
Bessemer	**Bessemer Motor Truck Co.**	**Grove City, Pa.**

CAR	BODY										POWER PLANT							
	Capacity	Length	Width	Overall Length	Overall Width	Wheelbase	Tread	Weight Chassis	Maximum Speed	Driver's Seat	Number Cylinders	How Cast	Bore	Stroke	Power	Carburetion	Ignition	Lubrication
Dominion	2,000	100	64	175	68	110	56	3,200	20	Behind	4	Block	4.1	4.5	35.0	Stromberg	Bosch	Splash
Federal	2,000	99	66	167	71	110	56	3,100	...	Behind	4	Pairs	4.5	4.5	30.0	Stromberg	Bosch	Spl. & F. F.
Franklin	2,000	96	44	147	77	94	56.5	2,100	18	Above	4	Sep.	3.3	4.0	18.0	Own	Bosch	Splash
Garford	2,000	120	60	162	68	125	56	3,600	18	Above	4	Pairs	4.0	3.7	26.0	Mayer	Splitdorf	Force Feed
G-M-C	2,000	96	48	179	68	126	56	4,070	15	Behind	4	Block	3.5	5.2	20.0	Schebler	Jump Spark	Splash
Grabowsky	2,000		...	...	...	121	56	...	15	Above	4	Pairs	4.2	4.5	28.9	Float Feed	Bosch	Spl. & F. F.
Gramm	2,000	111	48	162	...	106	56	2,800	17	Above	4	Block	4.0	5.0	...	Float Feed	Bosch	Spl. & F. F.
Hart-Kraft	2,000	86	45	174	68	118	58	3,000	18	Behind	4	Block	4.1	5.2	30.0	Schebler	Magneto	Spl. & Pump.
Hatfield	2,000	84	48	116	65	96	56	2,100	15	Behind	3‡	Sep.	4.1	4.0	20.0	Holley	Bosch	With Fuel
Ideal	2,000	108	44	172	68	115	56	2,800	18	Above	4	Pairs	3.5	4.2	24.0	Float Feed	Bosch	Spl. & Pump.
Indiana	2,000	116	50	195	70	120	58	2,800	15	Behind	4	Sep.	4.0	4.0	30.0	...	Bosch	Spl. & F. F.
Kisselkar	2,000	96	60	...	...	132	...	...	25	...	4		4.5	4.7	40.0	Stromberg	Bosch	Splash
Lambert	2,000			...	...	...	56	...	...	Behind	...		...	...	...	Breeze	Remy	Pump
Lauth-Juergens	2,000	126	48	185	62	104	56	2,400	15	Above	2	Sep.	5.0	5.0	24.0	Schebler	Bosch	Force Feed.
Little Giant	2,000	90	44	144	68	90	56	2,050	20	Above	2	Sep.	5.0	4.0	20.0	Schebler	Splitdorf	Mechanical.
McIntyre	2,000	106	42			119	56	2,000	14	Behind	2	Sep.	5.2	4.7	22.0	Float Feed	Briggs	Splash
Mack	2,000	96	48	180	68	122	58	3,200	25	Behind	4	Pairs	4.5	5.5	32.0	Stromberg	Bosch	Spl. & F. F.
Maytag-Mason	2,000					...	...	1,000	15	Above	2	Sep.	5.8	5.0	20.0	Schebler	Jump Spark	Spl. & F. F.
Monitor	2,000	86	42	...	...	100	56	2,800	15	Above	2	Sep.	5.2	4.7	24.0	Schebler	Bosch	Force Feed
Natco	2,000	...	...	156	65	104	56	2,300	16	Side	4	Block	3.5	5.0	20.0	Float Feed	Magneto	Force Feed.
Oliver	2,000	96	48	...		118	60	3,200	16	Behind	2	Sep.	5.0	5.0	24.0	Float Feed	Mea	Force Feed
P-H-P	2,000	123	66	174	72	115	56	3,400	15	Side	4	Block	4.0	4.5	30.0	Float Feed	Jump Spark	Spl. & F. F.
Plymouth	2,000	108	52	165	68	123	56	3,200	18	Above	4	Pairs	4.2	5.0	28.0	Float Feed	Splitdorf	Spl. & F. F.
Rassel	2,000	84	56	134	66	96	56		18	Above	2	Sep.	5.5	4.7	22.0	Schebler	Splitdorf	Force Feed
Sanford	2,000	96	46	144	66	88	56	2,250	15	Above	3	Sep.	4.0	4.5	20.0	Float Feed	Bosch	Splash
Schmidt	2,000	92	42	144	66	96	56	2,200	20	...	2	Sep.	5.0	5.0	20.0	Schebler	Simms	Spl. & F. F.
Service	2,000	84	44	174	66	114	56	2,400	...	Side	4	Block	3.7	5.2	30.0	Stromberg	Dual	Splash
Siebert	2,000			...	...	120	56	2,900	18	Behind	4	Block	3.7	5.2	30.0	Carter	Simms	Splash
Stegeman	2,000	96	...	...	...	130	56	3,000	18	Behind	4	Block	3.7	5.2	30.0	Float Feed	Jump Spark	Spl. & F. F.
Tractor†	2,000	104	49	147	75	87	69	5,500	10	Above	4	Block	4.1	4.5	30.0	Schebler	Bosch	Force Feed
Utility	2,000	108	60	168	66	110	56	2,700	...	Above	4	Pairs	4.2	5.0	35.0	Float Feed	Splitdorf	Force Feed
Van-L	2,000	114	42		...	118	56	...	...	Side	4	Pairs	3.7	4.0	24.0	...	Splitdorf	Spl. & Pump.
Victor	2,000	108	44	...	...	120	56	...	...		4	...	4.0	4.5	30.0	Schebler	Bosch	Spl. & F. F.
Westman	2,000	108	48	168	102	105	56	3,550	20	Front	4	Block	3.7	5.2	30.0	Float Feed	Jump Spark	Spl. & F. F.
Whitesides	2,000	150	...	...	...	118	56	...	...	...	4	Block	...	...	40.0	Marvel	Splitdorf	Splash
Wilcox	2,000	112	48	204	70	117	56	3,400	16	Behind	4	Pairs	4.2	4.5	30.0	Bennett	Bosch	Splash
Winkler	2,000	120	48	168	60	107	56	...	20	Above	4	Pairs	4.2	4.0	25.0	Schebler	Splitdorf	Force Feed.

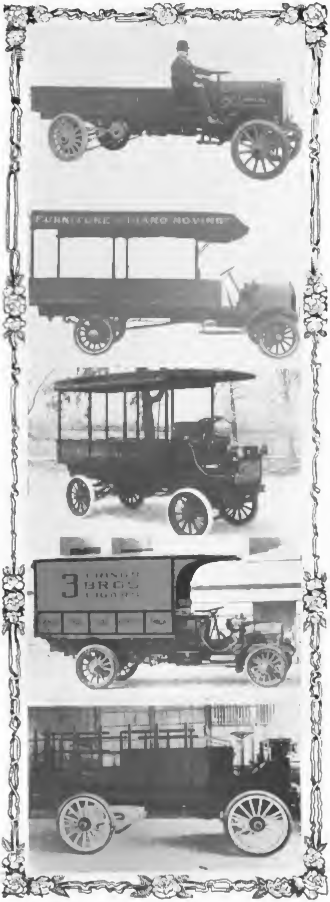
2,001 to 3,000 Pounds :

CAR	Capacity	Length	Width	Overall Length	Overall Width	Wheelbase	Tread	Weight Chassis	Maximum Speed	Driver's Seat	Number Cylinders	How Cast	Bore	Stroke	Power	Carburetion	Ignition	Lubrication
Brandon**	2,500	96	48	162	60	108	56	2,600	25	Behind	3	Sep.	4.5	5.5	45.0	Schebler	K-W	Force Feed
Cortland	2,500	...	...	...	...	96	56	...	15	Above	2	Sep.	5.0	5.0	22.0	Float Feed	Jump Spark	Force Feed
Eclipse	2,500	...			...	106	56	3,000	25	Above	4	...	4.0	4.0	30.0	Stromberg	Bosch	...
American Eagle	3,000	108	42	189	64	115	56	...	...	Behind	4	Pairs	4.0	5.0	25.6	Stromberg	Bosch	Spl. & F. F.
Autocar	3,000	100	50	...	...	97	58	3,000	...	Above	2	Sep.	4.7	4.5	18.0	Stromberg	Bosch	Force Feed
Blair	3,000		...	137	70	114	60	4,000	15	Side	4	Block	4.1	5.2	30.0	Schebler	Bosch	Pump
Chase	3,000	94	50	180	72	112	62		15	Behind	3‡	Sep.	4.5	5.0	40.0	Float Feed	Jump Spark	With Fuel
Cortland	3,000	120	42			92	56	2,800	20	Above	2	Sep.	5.0	5.0	24.0	Schebler	Remy	Mechanical
Decatur	3,000	144	60	...	...	129	56	3,000	20	Above	4	Sep.	4.0	4.0	30.0	Rayfield	Simms	Force Feed
Dynamic	3,000	...	...	...	...	84	56	3,100	15	Above	4	Block	...	...	30.0	Optional	Magneto	Force Feed
Garford	3,000	112	50	206	72	120	56	3,400	25	Behind	4	Pairs	4.7	5.2	40.0	Float Feed	Bosch	Splash
Grabowsky	3,000				...	121	56		15	Above	4	Pairs	4.2	4.5	28.9	Float Feed	Bosch	Spl. & F. F.
Hart-Kraft	3,000	95	45	186	68	127	58	3,800	18	Behind	4	Block	4.1	5.2	30.0	Schebler	Magneto	Spl. & Pump
Ideal	3,000	120	60	186	70	124	56	3,600	15	Above	4	Block	4.1	5.2	35.0	Float Feed	Bosch	Spl. & Pump.
Johnson	3,000	111	48	159	67	96	56		14	Above	4	Pairs	4.2	4.5	30.0	Stromberg	Optional	Splash
McIntyre	3,000	106	42	187	...	119	56	2,300	13	Behind	4	Pairs	4.1	4.7	31.2	Float Feed	Briggs	Splash
Mais	3,000		...	191	66	119	56	4,500	15	Behind	4	Pairs	4.0	5.2	30.8	Rayfield	Eisemann	Spl. & F. F.
Oliver	3,000	...			...	133	60	...	24	Behind	2	Sep.	5.0	5.0	20.0	Stromberg	Mea	Force Feed
Sampson	3,000	108	60	163	71	110	58	4,200	18	Above	4	Pairs	4.0	5.0	25.0	Float Feed	Jump Spark	Spl. & F. F.
Sandusky	3,000	114	82	180	62	106	56	3,400	15	Above	4	Block	3.7	5.0	30.0	Float Feed	Mea	Splash
Sternberg	3,100	108	60	156	72	110	56.5	3,800	18	Above	4	Pairs	4.1	5.2	30.0	Stromberg	Eisemann	Spl. & F. F.
S. & L	3,000	...		180	...	115	58	3,000	15	Above	4	Pairs	4.2	5.0	35.0	Float Feed	Jump Spark	Spl. & F. F.
United States	3,000	120	45	...	...	120	56	3,100	15	Above	2	Sep.	3.2	4.5	22.0	Schebler	Atw't'r-Kent	Force Feed
Velie	3,000	144	66	...	...	148	65	5,500	15	Behind	4	Pairs	4.5	5.2	40.0	Stromberg	Splitdorf	Spl. & Pump
Westman††	3,000	108	48	168	68	105	56	3,550	...	Front	4	Pairs	4.2	4.5	50.0	Stromberg	K-W	Spl. & F. F.
Wilcox	3,000	141	66	204	70	117	58	4,000	15	Side	4	Pairs	4.2	4.5	30.0	Bennett	Bosch	Splash

3,001 to 4,000 Pounds :

CAR	Capacity	Length	Width	Overall Length	Overall Width	Wheelbase	Tread	Weight Chassis	Maximum Speed	Driver's Seat	Number Cylinders	How Cast	Bore	Stroke	Power	Carburetion	Ignition	Lubrication
American	4,000	120	51	201		132	56.5	...	15	Behind	4	Pairs	4.8	5.5	45.0	Float Feed	Bosch	Splash
Alco	4,000			177	82	112	66	4,500	18	Above	4	Pairs	4.5	5.5	30.0	Float Feed	Bosch	Force Feed
Atlas	4,000	132	66	210	72	144	108	3,200	20	Behind	4	Pairs	4.5	4.5	40.0	Float Feed	Jump Spark	With Fuel
Atterbury	4,000	120	60	...		144	58	3,300	16	Behind	4	Block	4.2	4.5		Schebler	Bosch	Force Feed
Avery	4,000	123	52	...	...	110	62	...	20	Side	4	Sep.	4.7	5.0	45.0	...	Jump Spark	Spl. & F. P.
Beaver	4,000	120	66	168	68	112	58	3,800	12	Above	2	Sep.	5.5	5.0	28.0	Breeze	Bosch	Force Feed
Beck	4,000	108	60	156	62	120	52	...	15	Above	2	Sep.	5.0	5.5	24.0	Float Feed	Battery	Force Feed
Board	4,000	132	54	198	75	130	58	...	...	Above	4	Pairs	4.5	5.5	35.0	Float Feed	Bosch	Force Feed
Cass	4,000	108	74	204	78	130	56	4,300	15	Behind	4	Sep.	4.2	5.0	35.0	Kingston	Bosch	Pump
Chase	4,000	120	50	180	72	120	62		12	Behind	3‡	Sep.	4.5	5.0	30.0	Holley	Bosch	With Fuel
De Dion	4,000	144	72	167	75	130	64	2,800	20	Above	4	Pairs	3.0	4.7	14.0	Own	Bosch	Force Feed
Durable Dayton	4,000		...		...	120	65	4,700	15	Above	4	Pairs	...	...	...	Stromberg	Jump Spark	Pump
Garford	4,000	150	60	218	68	140	56	4,650	15	Above	4	Pairs	4.7	5.2	40.0	Own	Bosch	Force Feed
G-M-C	4,000	141	72	245	77	142	65	5,050	13.5	Behind	4	Block	4.0	6.0	25.0	Schebler	Jump Spark	Spl. & F. F.
Gopher	4,000	114	48	186	...	112	56	4,000	...	Above	4	Pairs	4.2	4.7	38.0	Schebler	Remy	Force Feed
Grabowsky	4,000					121	56	...	14	Above	4	Pairs	4.2	4.5	28.0	Float Feed	Bosch	Spl. & F. P.
Gramm	4,000	132	54	180		117	60	3,000	16	Above	4	Pairs	4.2	4.5	...	Rayfield	Bosch	Splash
Hart-Kraft	4,000	100	45	194	68	130	58	4,200	16	Behind	4	Block	4.2	5.2	32.0	Schebler	Optional	Spl. & Pump.
Hewitt	4,000	108	48	159	78	112	60	4,200	18	Above	2	Sep.	5.5	5.0	24.0	Schebler	Bosch	Splash
Juno	4,000	138	60	192	78	132	60	5,000	16	Above	4	Pairs	4.2	5.0	30.0	Stromberg	Eisemann	Force Feed
Kelly	4,000	168	54		...	136	66	4,800	15	Above	4	Sep.	4.3	5.1	30.0	Breeze	Bosch	Spl. & F. F.
Kissel-Kar	4,000	120	60			140	60		25	...	4	...	4.5	4.7	40.0	Stromberg	Bosch	Splash
Knox	4,000	120	60			103	59	4,600	15	Side	4	Sep.	5.0	4.7	40.0	Stromberg	Jump Spark	Force Feed
Lambert	4,000	...	...		...		56	2,200	18	Side	4	Pairs	...	...	...	Schebler	Remy	Pumps
Louth-Juergens	4,000	168	66	228	69	120	58	4,800	20	Above	4	Sep.	4.5	5.0	35.0	Rayfield	Bosch	Spl. & F. F.
McIntyre	4,000				...	112	56	4,500	14	Behind	4	Block	4.1	5.2	...	Float Feed	Briggs	Splash
Modern	4,000	132	66	198	72	118	56	4,500	15	Above	4	Block	4.1	5.2	35.0	Schebler	Bosch	Spl. & F. F.
Morgan	4,000	120	60	162	66	113	62	5,000	16	Side	4	Block	4.2	5.1	27.0	Own	C. & H.	Spl. & F. F.
Packard	4,000	107	72	202	74	120	61	4,675	14	Behind	4	Pairs	4.1	5.1	26.0	Own	P-Eisemann	Spl. & F. F.
Packers	4,000	120	54	...	...	130	60	4,300	15	Behind	4	Pairs	4.2	4.5	30.0	Float Feed	Splitdorf	Spl. & F. F.
Panhard	4,000	144	72			120	61	3,000	30	Above	4	Sep.	3.5	5.1	18.0	Own	Magneto	Spl. & F. F.
Seitz	4,000	144	66	192	66	118	62	5,000	18	Above	4	Pairs	4.5	5.0	40.0	Schebler	Remy	Spl. & F. F.
Stegeman	4,000	128	...	...	...	140	60	3,800	15		...	...	4.1	5.2	...	...	...	
Sternberg	4,000	120	60	172	72	136	56.5	1,000	15	Above	4	Pairs	4.2	5.0	35.0	Stromberg	Eisemann	Force Feed

COOLING		TRANSMISSION					TIRES			SPRINGS			BRAKES			
Circulation	Radiator	Clutch	Form	Speeds	Location	Final Drive	Front	Rear	Front Axle	Front	Rear	Steering	Emergency	Service	Frame	Retail Price
Thermo	Tubular	Cone	Select	3	With Jacksh.	Chs	36x4	36x4.5	I-beam	Semi-ell	Semi-ell	Gemmer	Hubs	J. S.	Pressed Steel	$2,850
Pump	Tubular	Cone	Select	3	Amidship.	Chs	36x3.5	36x4	I-beam	Semi-ell.	Semi-ell	Gemmer	Hubs	J S	Pressed Steel	2,300
Air		Disc	Select	3	Amidship	Worm	36x5.5	36x5.5	Tubular	Full-ell	Semi-ell	Own	Hubs	J S	Wood	2,500
Pump	Tubular		Friction		Amidship	Chs	34x3	34x3.5	I-beam	Semi-ell	Platf	Ross	Rever	Hubs	Pressed Steel	
Pump	Tubular	Disc	Select	4	With Jacksh	Chs	34x3	36x4	I-beam	Semi-ell.	Platf	Ross	Hubs		Rolled Steel	2,300
Pump	H'comb		Select	3	With Motor	Chs	34x3.5	34x4	I-beam	Semi-ell	Platf	W & N	Hubs	J S	Pressed Steel	
Thermo	Tubular	Disc	Select	3	Amidship	Chs	34x3.5	34x3.5	Square	Semi-ell	Semi-ell.	Screw	Hubs	J S	Channel Steel	2,000
Pump	Tubular	Cone	Select	3	Amidship.	Chs	34x3.5	36x4	Square	Full-ell	Platf.	W & N	J S	Hubs.	Wood & Steel	2,000
Air			Friction				x3	x3.5		Single	Semi-ell	Own	Cont	Rever	Angle Steel	1,200
Thermo	Tubular	Plate	Select	3	With Jacksh	Chs	36x3	36x3.5	Rect	¾-ell	¾-Platf	G & S	Hubs	J S	Wood & Steel	1,750
Pump	Tubular	Disc	Select	3	With Jacksh	Chs	34x3	34x4	I-beam	Semi-ell	Semi-ell	Ross	Hubs	J S	Channel Steel	2,000
		Cone	Select	4		Shaft	37x5	37x5	I-beam	Semi-ell	Semi-ell				Pressed Steel	2,250
Pump			Friction		Amidship	Chs	36x3	36x3.5	I-beam	Semi-ell	Semi-ell.	Ross	Hubs	J S	Channel Iron	
Thermo.	Pump	Disc	Select	3	Amidship	Chs	32x4	32x3.5	I-beam	Semi-ell	Semi-ell	Ross	J S	Hubs	Angle Steel	1,650
Thermo		Disc	Plan	2	With Motor	Chs	36x2	36x2.5	Rect	¾-ell	Full-ell	Gemmer	Hubs.	Hubs	Angle Steel	1,300
Thermo.	Tubular		Plan	2	With Jacksh	Chs	34x2.5	34x2.5				Own	Hubs	J S	Channel Steel	1,300
Pump.	H'comb	M Disc	Select	3	With Jacksh	Chs	36x4	36x2.5 D	I beam	Semi-ell	Platf	Own	Hubs	J. S.	Channel Steel	2,500
C Pump	Vertical	Cone	Plan	2		Ch	34x2.5	34x3	Tubular	Semi-ell	Full-ell	S & N	Hubs	J S	Pressed Steel	
Thermo	Tubular	Cone	Select	3	Amidship	Shaft	36x3	36x3.5	I-beam	Semi-ell	Full-ell	Ross	Hubs	Hubs	Pressed Steel	1,750
Thermo	Tubular	Cone	Select	3	With Jacksh	Chs	36x3.5	36x3.5	Rect	Semi-ell	Semi-ell	Own	Hubs	Hubs	Pressed Steel	
Thermo	Tubular	Disc	Plan	2	With Motor	Chs	36x3.5	36x3.5	I beam	Semi-ell	Semi-ell	Lavigne	Hubs	Trans	Pressed Steel	2,300
Pump	Tubular	Disc	Select	3	With Motor	Chs	34x3.5	34x3.5 L	I beam	Semi-ell	Semi-ell	Foster	Hubs	Hubs	Channel	1,500
Pump	Tubular		Friction		Amidship	Chs	34x3	34x3.5		Semi-ell	Platf	Ross	Rever		Channel	2,100
Thermo	Tubular	Cone	Select	3	Amidship	Chs	34x2.5	34x3	Square	Semi-ell	Platf	Warner	J S	Hubs	Pressed Steel	1,350
Air		Cone	Plan	2	Amidship	Chs	36x3	36x3	I-beam	Semi-ell.	Platf	B-L		Hubs	Steel	1,500
Air		Disc	Plan	2	With Motor	Chs	36x2.5	38x2.5	Square	¾-ell	Full-ell	Ross		Exp	Channel Steel	1,375
Pump	Tubular		Friction				38x3	38x3	I-beam	Semi-ell	Semi-ell	Ross	Exp	Exp	Pressed Steel	1,350
Thermo.	Tubular	Disc	Slid	3	With Jacksh	Chs	36x3.5	36x3.5	Square	¾-ell	Platf	W. & S	Hubs	J. S	Pressed Steel	1,900
Pump	Tubular	Plate	Select	3	With Motor	Shaft	34x3	36x4.5	Square	Semi-ell	Platf	W & W	Hubs.	J S	Pressed Steel	2,250
Thermo			Friction		Amidship	Chs	36x4	38x6	Square	Semi-ell.	Platf	Own	Hubs	Hubs	Steel	1,200
Pump	H'comb		Friction		Amidship	Chs	40x3	40x3	Square	Semi-ell	Platf	Own	Rever	Hubs	Angle Steel	2,000
Thermo	Tubular	Cone		3		Chs	36x3	40x3.5	Square	Semi-ell	Platf	Ditw	Hubs	J S	Pressed Steel	1,650
Pump	H'comb	Disc	Select	3	With Motor	Chs	34x3	34x4		Semi-ell	Semi-ell	Worm	Hubs	J S	Channel Steel	2,100
Pump	H'comb	Cone	Select	3	On Front Ax	Gear	36x4	36x5	I-beam	Semi-ell	Semi-ell	Warner	Hubs	Hubs	Channel Iron	2,000
Thermo	H'comb	Disc	Plan	2	Amidship	Chs	x2.5	x2.5	I-beam	Full-ell	Full-ell	Ross	Exp	Shaft	Wood & Steel	1,500
Pump	Tubular	Cone	Select	3	Amidship	Chs	36x3	36x3.5	I-beam	Full-ell	Platf	Warner	Hubs	J S	Channel Steel	2,300
Pump	Tubular	Disc	Prog	3	Amidship	Chs	34x3	34x3	Square	Semi-ell	Platf	Ross	Hubs	J S	Channel Steel	2,000
Thermo.	Tubular	Own	Select	3	With Axles	Gear	36x3.5	36x3.5	Tubular	Full-ell	Full-ell	Worm	Hubs	Shaft	Angle Steel	2,300
Thermo.	H'comb		Plan	2	Amidship	Chs	34x3	34x3.5	Square	Full-ell	Full-ell	Barnes		Hubs.	Wood & Steel	1,750
	Tubular	Cone	Select	3	With Jacksh	Chs	36x1 7	36x1 7	Square	Semi-ell	Platf	Ross	Hubs.	J. S	Channel Steel	
Thermo.	Tubular	Cone	Select	3	With Jacksh	Chs	34x3.5	34x4	Square	Semi-ell.	Platf.	Own	Hubs	J S	Channel Steel	
Pump	Tubular	Plate	Prog	3	Amidship	Shaft	34x3.5	34x4	Tubular	Semi-ell	Platf.	Own	Hubs	Hubs	Wood & Steel	
Pump	Tubular	Cone	Select	3	Amidship	Worm	34x4	34x3 D	I-beam	Semi-ell	Platf	Gemmer	Hubs	J S	Pressed Steel	3,000
Air		Cone	Select	3	With Jacksh	Chs	36x3	38x3.5	Square	Full-ell	¾-Platf	Barnes	Trans.	Hubs	Steel & Wood	
Thermo	Tubular	Cone	Plan	2	Amidship	Chs	34x3.5	34x3.5		Full-ell	¾-ell	W & S	Rever	Hubs	Wood	928
Pump	H'comb	Disc	Select	3	Amidship	Chs	34x3.5	34x4		Semi-ell.	Platf.	Ross	Hubs	Hubs	Pressed Steel	2,500
Pump	H'comb	Disc	I. Cl	2	Amidship	Shaft	38x	38x	Tubular			Own	Hubs	Hubs	Channel Steel	
Pump	Tubular	Cone	Select	4	Amidship	Shaft	36x4.5	36x4.5 D	I-beam	Semi-ell.	Semi-ell	Own	Hubs	Hubs	Pressed Steel	2,800
Pump	H'comb		Select	3	With Motor	Chs	36x4	36x4	I-beam	Semi-ell.	Platf	W & N	Hubs	J S	Pressed Steel	
Pump	Tubular	Disc	Select	3	Amidship	Chs	34x3.5	36x5	Rect	Semi-ell	Semi-ell	W & N	J S	Hubs	Wood & Steel	2,300
Pump	Tubular	Cone	Select	3	With Jacksh	Chs	36x3.5	36x4	Rect	Semi-ell	¾-Platf	G & S	Hubs	J S	Pressed Steel	2,200
Pump	H'comb	Cone	Select	3	Amidship	Chs	34x3.5	34x3.5		Semi-ell	Semi-ell	Own	J S	Hubs	Channel Steel	2,000
Thermo	H'comb		Plan	2	With Jacksh	Chs	34x3	34x3.5	I-beam	Full-ell	¾-Platf	Own	Hubs.	J S	Channel Steel	1,600
Thermo	Tubular	Exp	Prog	2	With Motor	Shaft	36x3.5	36x3 D	Tubular	Semi-ell.	Semi-ell	Own	Shaft	Hubs	Channel Steel	
Thermo	Tubular	Disc	Plan	2	With Motor	Shaft	36x	36x	I-beam	Semi-ell	Semi-ell	Lavigne	Hubs	Trans	Pressed Steel	2,200
Thermo.	Tubular	Disc	Select	3	Amidship	Chs	32x4	34x3	I-beam	Semi-ell	¾-Platf	W & N	Hubs	Hubs	Pressed Steel	
Pump	Tubular	Cone	Select	3	With Motor	Chs	40x3.5	40x3	Rect	Semi-ell	Platf	Ross	Hubs	Int	Ch. Nick St	2,400
Pump	Tubular	Disc	Select	3	Amidship	Chs	34x3.5	36x4.5	I beam	Semi-ell	Semi-ell	Ross	Lever	Pedal	Pressed Steel	2,300
Pump		Disc	Select	3	Amidship	Chs	40x3	40x3.5	Square	Semi-ell	¾-Platf	Foster	Hubs	J S	Channel Steel	2,000
Thermo		Cone	I Cl	3	Amidship	Chs	34x3	36x3.5	Square	Semi-ell	Full-ell	Ross	Hubs	J S	Channel Steel	2,250
Thermo	H'comb	Disc	Select	3	Amidship	Chs	36x3	36x3.5 D	I-beam	Semi-ell	Semi-ell	W & S	Hubs	J S	I-beam	3,000
C. Pump.	H'comb	Cone	Select	3	Front Axle	Shaft	36x3	36x5	I-beam	Semi-ell	Semi-ell	Warner	Hubs	Hubs	Channel Iron	2,300
Pump	Tubular	Cone	Select	3	Amidship	Chs	36x3.5	36x4	I beam	Full-ell	Platf	Warner	Hubs	J S	Channel Steel	2,300
Pump	Tubular	Cone	Select	3	Amidship	Chs	36x4	36x5	I-beam	Semi-ell	Semi-ell	Ross		J. S	Wood & Steel	3,000
Pump	Tubular	Disc	Select	3	Amidship	Chs	36x4	36x3 D	I-beam	Semi-ell	Semi-ell	Own	Hubs	J S	Channel Steel	2,750
Pump	H'comb	Plate	Select	3	With Motor	Shaft	34x4	34x4	I-beam	Semi-ell	Semi-ell.	Gemmer	Trans.		Channel Steel	2,800
Pump	Tubular	Plate	Select	3	With Motor	Chs	36x3.5	36x3.5 D	I-beam	Semi-ell	Semi-ell	Own	Hubs	Hubs	Pressed Steel	
Pump	H'comb.	Disc	Select	3	Amidship	Chs		x3.5 D	Double	Semi-ell	Semi-ell	Own	Hubs	J S	Steel Bars	2,500
Thermo	Tubular	Plate	Select	3	Amidship	Chs	36x4	36x4.5		Semi-ell	Platf	Own	Hubs	J S	Channel Steel	2,650
Pump	H'comb.		Plan	2	With Motor	Chs	36x3.5	36x3.5 D	Square	Platf	Platf	Ross				1,500
Pump	H'comb	Disc	Select	3	Amidship	Chs	36x4	36x3 D	I-beam	Semi-ell	Semi-ell	Ross	Hubs	Hubs	Channel Steel	
Pump		Plate	Select	4	With Motor	Chs	34x3.5	34x3.5 D		Semi-ell	Semi-ell.	Ross	Hubs	J S	Channel Steel	2,650
Air		Cone	Select	3	With Jacksh	Chs	36x3.5	38x4	I-beam	Full-ell	Platf	Barnes	J S	Hubs	Wood & Steel	2,200
Pump	Tubular	Disc	Select	3	Amidship	Shaft	32x4	36x3.5	I-beam	Semi-ell	Semi-ell	Own	Hubs	Shaft	Wood & Steel	3,750
Pump	Tubular	Disc	Select	3		Shaft	36x4	36x3 D	I beam	Semi-ell	Platf	Ross	Hubs	J S	Channel Steel	2,300
Pump	Tubular		Friction		Amidship	Chs	34x3.5	36x3 D	I beam	Semi-ell	Platf	Ross		Hubs	Channel Steel	
Pump	Tubular	Disc	Select	4	With Jacksh	Chs	34x4	36x3.5 D	I-beam	Semi-ell	Semi-ell	Ross	Hubs	Hubs	Channel Steel	2,750
Pump	Tubular	Cone	Select	3	Amidship	Chs	34x4	34x3 D	I-beam	Semi-ell	Semi-ell	Ross	Hubs	J S	Channel Steel	2,450
Pump	H'comb		Select	3	With Motor	Chs	36x4	36x3.5 D	I-beam	Semi-ell	Platf	W & N	Hubs	J S	Pressed Steel	
Pump.	Tubular	Disc	Select	3	Amidship	Chs	36x4	36x3 D	Square	Semi-ell	Semi-ell	Screw	Hubs	J S	Channel Steel	2,600
C. Pump.	Tubular	Disc	Select	3	Amidship	Chs	34x4	36x3 D	Rect	Semi-ell	Semi-ell	W & N	J S	Hubs	Wood & Steel	2,750
Thermo	H'comb	Cone	Plan	2	Amidship	Chs	34x4	34x3.5 D	Square	Semi-ell	Semi-ell	Own	Hubs	J S	Channel Steel	2,750
Pump	Tubular	Disc	Select	3		Chs	36x4	36x3 D	Rect	Semi-ell	Platf	Ross	Hubs	J S	Channel Steel	2,650
Air		Disc	Select	4	Amidship	Chs	36x4	36x5	I-beam	Semi-ell	Platf	Ross	Hubs	J S	Channel Steel	
		Cone	Select	4		Chs	34x4	36x3.5 D	I-beam	Semi-ell	Semi-ell	Worm	Hubs	J S	Pressed Steel	2,750
Pump	Tubular	Plate	Select		With Motor	Chs	34x5	34x4 L	I beam	Semi-ell	Semi-ell	Ross	Hubs	J S	Channel Steel	
Pump	Vertical		Friction			Chs	36x3.5	36x4	I-beam	Semi-ell	Semi-ell	Ross	Hubs	J S	Channel Steel	
Pump	H'comb	Disc	Select	4	With Jacksh	Chs	36x4	36x5	I-beam	Semi-ell	Semi-ell	Ross	J S	Hubs	Channel Steel	2,700
Thermo.	H'comb	Plate	Select	3	With Motor	Chs	34x4	34x3.5 D	I-beam	Semi-ell	¾-Platf	Own	Hubs	J S	Channel Steel	2,300
Pump	H'comb.	Disc	Select	3	With Jacksh	Chs	36x4	36x5	I-beam	Semi-ell	Semi-ell	Ross	Hubs	J S	Channel Steel	2,600
Pump	H'comb.	Plate	Select	3	With Jacksh	Chs	34x4	35x4	I-beam	Semi-ell	Full-ell	Own	Hubs	Hubs	Channel Steel	3,000
C Pump	H'comb	Plate	Prog	3	With Jacksh.	Chs	34x3.5	34x4 D	I-beam	Semi-ell	Semi-ell	Own	Hubs	J S	Channel Steel	3,000
Pump	Tubular	Disc	Select	3	With Jacksh.	Shaft	36x3.5	36x5	I-beam	Semi-ell	Semi-ell	Ross	Hubs	J S	Channel Steel	2,500
Pump	Tubular	Disc	Prog	4	Amidship.	Chs	36x4.5	36x4.5		Semi-ell	Semi-ell	W & S	Hubs	J S	Wood & Steel	[illegible]
Pump			Friction		Amidship.	Chs	34x4	34x2.5 D	I-beam	Semi-ell	Platf	Own	Rever	Hubs.	Channel Steel	[illegible]
						Chs	34x4	36x3 D				W & N			Pressed Steel	2,950
Pump	Tubular	Plate	I Cl	3	Amidship	Chs	34x4	36x3	I beam	Semi-ell	Platf	Ross	I. S	Hubs	Pressed Steel	



Avery Farm and City Tractor, a Combination Truck
Atlas Two-Ton Carrier with Two-Cycle Engine
Gramm Truck of Two Tons Capacity
Hart-Kraft Vehicle Which Handles 5000 Pounds
Sandusky Truck, a New 3000-Pound Wagon

The ratio of bore to stroke has changed little, also, although there is noticeable now a tendency toward the longer travel. Following the great changes made in this direction for pleasure vehicles and the general realization of the benefits accruing therefrom another season will show a very large list of the best cars included in the long-stroke category. As it is, the present list shows 36 motors with a stroke of six inches or more, of which eight are longer than 6.25 inches. The following four very recent additions to the commercial vehicle manufacturers give a good general idea of the tendency, these being selected from the list at random and being used on cars from 1,500 pounds up to six tons capacity: Four-inch bore by six-inch stroke; five by 6.5 inches; 4.5 by 6.5, and 5.25 by eight.

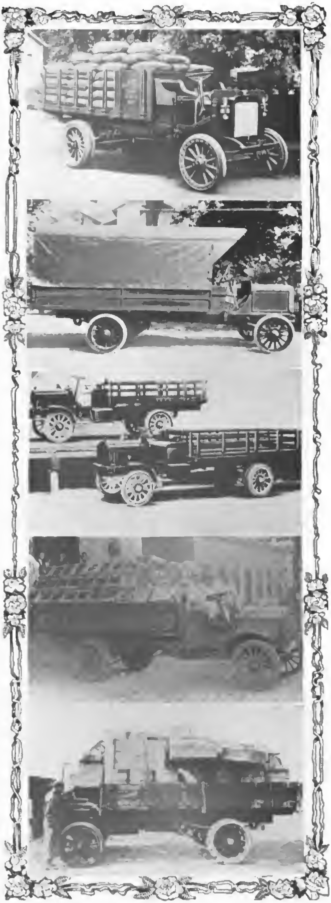
Ignition Systems Almost Standardized

Ignition is a prominent engine component, but energetic action in this line several years ago has brought fruit, as will be noted in the table under the startling unanimity for a dual ignition system using a magneto as a source of current for one and batteries, either dry or storage, for the other, the latter two working through a coil and usually utilizing the distributor of the current generator. Two sets of plugs are general, one for the battery group and the other for the magneto. As has been stated, the tendency toward simplification has brought about the successful trial by a large number of makers of the fixed sparking point. The use of this would eliminate the spark lever, thus subtracting one from the parts to be manually controlled. Along this same line a few firms are limiting the throttle range of activity by the application of a governor, which comes into play at the maximum engine speed. This not alone saves the motor from destructive rotative rates, but is said to have a marked influence upon fuel consumption and general vehicle depreciation and repair account.

Lubrication has resolved itself into the general use of

NAMES AND LOCATION OF CAR MAKERS

Cass	Cass Motor Truck Co.	Port Huron.
Clark	Clark Power Wagon Co.	Lansing, Mich.
Clark	Clark Delivery Co.	Gr. Cross., Chi.
Decatur	Decatur Motor Car Co.	Decatur, Ind.
Dominion	New Dominion Motors, Ltd.	W'k'rville, Ont.
Federal	Federal Motor Truck Co.	Detroit.
Franklin	H. H. Franklin Mfg. Co.	Syracuse.
Garford	Garford Co.	Elyria, O.
G-M-C	General Motors Truck Co.	Detroit.
Grabowsky	Grabowsky Pow. Wag. Co.	Detroit.
Gramm	Gramm Motor Truck Co.	Lima, O.
Hart Kraft	Hart Kraft Motor Co.	York, Pa.
Indiana	Harwood & Barley Mfg. Co.	Marion, Ind.
Lauth-Juergens	Lauth-Juergens M. C. Co.	Fremont, O.
Little Giant	Chicago Pneu. Tool Co.	Chicago.
Mack	International Motor Co.	Allentown, Pa.
Natco	National Motor Truck Co.	Bay City, Mich.



Blair Truck with Worm Drive Handles, 3000 Pounds
Barker, a Connecticut Three-Ton Vehicle
Packard Two and Three-Ton Commercial Cars
Schacht Three-Ton Wagon Loaded with Meat
Speedwell Four-Tonner with a Capacity Load

the so-called constant level splash system, in which a pump forces oil through leads to the main bearings, the surplus flowing into the lower part of the crankcase, where the interior is lubricated by splash, the level being regulated by special overflow standpipes. On lower priced cars the pump is frequently omitted, while a number of cases substitute a mechanical oiler for the pump. There is no unanimity in forms, the centrifugal, vane, gear and plunger being used in equal numbers.

In the way of cooling, the more simple thermo-syphon form has gained numerous converts during the past year, and now leads in actual numbers. In the lists, 68 users of the simple type are found, while air cooling is most numerous among the smaller, cheaper vehicles, and the pump with the heavier, more costly cars. There are actually 30 air-cooled engines in the list, of which 25 have a carrying capacity of 2,000 pounds.

Attention to Accessibility Pays

Accessibility is a notable attribute of all cars now, it having been proven to the manufacturer's satisfaction that this pays large dividends, while a lack of it will give the best car a black eye very quickly in the hands of an inexperienced driver. It is possible now to take off almost any one of the accessories, as magneto, distributor, timer, carburetor, water or oil pump without disturbing any other part and with less than 10 minutes' work, including only the removal of a few bolts or screws and the necessary connections.

Transmissions have changed little. The best class of heavy trucks may include four-speed gearboxes, but it cannot be said that this is general, not more than 15 being found in the list. The three-speed, selective form is found on nearly all larger vehicles, while the low-priced rigs include a few two-speed types, many planetaries and some friction forms. Clutches, too, indicate little alteration of opinion on the part of designers, the disc and plate forms together totaling 142 and the

NAMES AND LOCATION OF CAR MAKERS

Plymouth	Plymouth Motor Truck Co.	Plymouth, O.
Rassel	E. C. Rassel Mfg. Co.	Toledo.
Sanford	Sanford-Herbert Co.	Syracuse.
Service	Service Motor Car Co.	Wabash, Ind.
Stegeman	Stegeman Motor Car Co.	Milwaukee.
Tractor	De Loach Mfg. Co.	Atlanta.
Utility	Stevenson Motor Car Co.	S. Milwaukee.
Van L	Van L Commercial Car Co.	Grand Rapids.
Westman	Westman Motor Truck Co.	Cleveland.
Wilcox	H. E. Wilcox M. C. Co.	Minneapolis.
Winkler	Winkler Bros. Mfg. Co.	So. Bend, Ind.
Brandon	Commercial Motor Car Co.	S. H'ston, Tex.
Eclipse	Eclipse Truck Co.	Franklin, Pa.
Am. Eagle	American Eagle M. C. Co.	New York City.
Autocar	Autocar Co.	Ardmore, Pa.
Blair	Blair Mfg. Co.	Newark, O
Dynamic	Cleveland Motor Truck Co.	Cleveland.

CAR	BODY										POWER PLANT							
	Capacity	Length	Width	Overall Length	Overall Width	Wheelbase	Tread	Weight Chassis	Maximum Speed	Driver's Seat	Number Cylinders	How Cast	Bore	Stroke	Power	Carburetion	Ignition	Lubrication
S & S	4,000					125	62	3,900	12	Above	4	Sep	4.7	5.0	16.0	Schebler	Eisemann	Spl. & F. F.
Victor	4,000	138	51			140	66				4	Sep	4.1	5.2	10.0	Schebler	Bosch	Spl. & F. F.
Walter	4,000	108	72			124	58	3,600	18	Behind.	4	Pairs	4.0	5.0	30.0	Stromberg	Bosch	Force Feed

4,001 to 6,000 Pounds :

CAR	Capacity	Length	Width	Overall Length	Overall Width	Wheelbase	Tread	Weight Chassis	Maximum Speed	Driver's Seat	Number Cylinders	How Cast	Bore	Stroke	Power	Carburetion	Ignition	Lubrication
Blair	5,000	138	66	144	72	121	11	4,200	14	Side	4	Pairs	4.5	5.5	45.0	Schebler	Bosch	Force Feed
Hart-Kraft	5,000	120	60	216	68	140	58	4,800	15	Behind	4	Pairs	4.5	5.5	40.0	Schebler	Jump Spark	Spl. & F. F.
Main	5,000			218	66	132	56	5,400	12	Behind	4	Pairs	4.0	5.2	40.0	Rayfield.	Eisemann	Spl. & F. F.
Atterbury	6,000	144	72			154	70	5,600	15	Behind	4	Pairs	4.7	5.5		Schebler	Bosch	Force Feed
Avery	6,000	148	76			140	62		15	Side	4	Sep	4.7	5.0	45.0		Jump Spark	Spl. & F. F.
Barker	6,000	168	72	74		150	64	5,600	14	Behind	4	Pairs	5.0	4.7	40.0	Mayer	Magneto	Splash
Blacker	6,000	188		188		120	60	4,600	12	Above	4	Pairs	5.0	5.0	40.0	Float Feed	Bosch	Splash
Board	6,000	162	60	222	77	144	62	5,375		Above	4	Pairs	5.0	5.0	45.0	Float Feed	Bosch	Force Feed
B-O-E	6,000	144	54	101		138	64		12	Above	4	Pairs	5.0	6.5	40.0	Float Feed	Splitdorf	Spl. & F. F.
Champion	6,000	132	60	168	68	124	58	5,100	12	Above	4	Pairs	4.7	5.5	45.0	Float Feed	Optional	Force Feed
Commer	6,000	96	69	216	73	132	63	4,900	25	Behind	4	Pairs	4.0	4.7	25.0	Float Feed	Bosch	Pump
Durable Dayton	6,000	150	66	....		136	66	6,300	15	Above	4	Pairs	4.7	5.5	45.0	Stromberg	Bosch	Pump
Frontenac	6,000	146	76	205	...	121	58	6,400	18	Above	4	Pairs	5.0	5.7	50.0	Stromberg	Magneto	Spl. & F. F.
Garford	6,000	144	68			120	61	5,500	12	Above	4	Block	4.2	5.2	30.0	Own	Bosch	Force Feed
Grabowsky	6,000					145	66		12	Above	4	Pairs.	5.0	5.0	40.0	Float Feed	Bosch	Spl. & F. F.
Gramm	6,000	150	60	205		124	68	5,000	14	Above	4	Pairs	5.0	5.0	40.0	Rayfield	Jump Spark	Spl. & F. F.
Hart-Kraft	6,000	144	60	240	72	148	65	5,000	14	Behind	4	Pairs	4.5	5.5	41.0	Schebler	Jump Spark	Force Feed
Hewitt	6,000	144	72	195	76	136	60	4,600	14	Above	2	Sep	5.5	5.0	24.0	Schebler	Bosch	Splash
Johnson	6,000	129	48	172	79	108	66	4,500	12	Above	4	Pairs	4.5	5.2	40.0	Stromberg	Optional	Splash
Jonz	6,000	142	72			130	66	5,000	14	Behind	4	Pairs	4.5	5.5	32.0	Schebler	Bosch	Splash
Junn	6,000	156	72	222	84	142	66	6,400	10	Above	4	Pairs	4.7	5.5	45.0	Float Feed	Eisemann	Force Feed
Kato**	6,000	144	72	186	76	120	56	4,500	15	Above	4	Pairs	4.7	5.0	36.0	Schebler	Remy	Force Feed
Kelly	6,000	150	54	204		156	66	5,200	15	Above	4	Sep	4.3	5.1	30.0	Breeze	Bosch	Spl. & F. F.
Kissel-Kar	6,000	148	72	232	72	144	68	5,300	18	Behind	4	Pairs	4.7	5.0	50.0	Stromberg	Optional	Splash
Knox	6,000	144	72			149	68	6,500	15	Above	4	Sep	5.0	4.7	40.0	Stromberg	Bosch	Force Feed
Kopp	6,000	132		186		116	64	5,800	15	Above	4	Pairs	4.7	5.5	50.0	Float Feed	Bosch	Spl. & F. F.
Lambert	6,000					138	56	4,800	12	Behind	4				50.0	Schebler	Remy	Pump
Lauth-Juergens	6,000	168	72	228	72	120	63	5,500	20	Above	4	Sep	4.7	5.0	45.0	Rayfield	Optional	Spl. & F. F.
Lord Baltimore	6,000	150	72			114		5,800	12	Above	4	Pairs	4.1	5.2	42.0		Bosch	Force Feed
McIntyre	6,000					140	56	5,300	12	Behind	4	Block	4.1	5.2	40.0	Float Feed	Briggs	Splash
Mack	6,000	144	66	204	87	129	68	6,000	16	Behind	4	Pairs.	5.5	6.0	48.4	Own	Bosch	Spl. & F. F.
Moeller	6,000	144	72	180	72	124	62	5,200	12	Above	4	Sep	4.5	5.0	32.4	Stromberg	Bosch	Spl. & F. F.
Morgan	6,000	150	72	198	78	127	63	7,300	10	Side	4	Block	4.6	5.0	44.0	Own.	U. & H.	Spl. & F. F.
Packard	6,000	140	72	237	81	144	68	5,900	12	Behind	4	Pairs	4.5	5.5	32.0	Own	P. Eisemann	Spl. & F. F.
Peerless	6,000					151		6,200	14	Behind	4	Pairs	4.5	6.5		Own	Bosch	Splash
Philadelphia	6,000	96	52			110	56		18	Above	4	Pairs	4.2	4.5	40.0	Float Feed	Bosch	Splash
Pope-Hartford	6,000	144	72	188		126	68		12	Above	4	Pairs			40.0	Own	Bosch	Mech. Splash
Sampson	6,000	144	66	206	82	140	70		13	Above	4	Pairs	4.5	5.5	43.0	Float Feed	Magneto	Spl. & F. F.
Schacht	6,000	137	66	218	81	144	64	4,600	14	Behind	4	Block	4.5	5.0	45.0	Schebler	Mea	Spl. & Pump
Schleicher	6,000			216	78		78	5,000	25	Optional	4	Pairs	5.0	5.5	45.0	Stromberg	Bosch	Spl. & F. F.
Seitz	6,000	144	72	204	72	124	62	5,500	18	Above	4	Pairs	5.0	5.0	45.0	Schebler	Remy	Spl. & F. F.
Stegeman	6,000	141				150	64	5,000	12				4.1	5.0				
S. & L.	6,000			216		145	58	5,000	12	Above	4	Pairs	4.7	5.5	45.0	Float Feed	Splitdorf	Spl. & F. F.
Universal	6,000	148	72	192	79	142	68	5,600	12	Above	4	Pairs	4.0	5.5	30.0	Rayfield	Bosch	Splash
Utility	6,000	168	72	216		116	60	5,800	...	Above	4	Pairs	5.0	5.5	45.0	Float Feed	Splitdorf	Force Feed
Velie	6,000	168	72	252	90	148	67.5	6,500	12	Behind	4	Pairs	4.5	5.2	40.0	Stromberg	Splitdorf.	Splash
Victor	6,000	144	72			140	66				4	Sep	4.7	5.5	50.0	Schebler	Bosch	Spl. & F. F.
Walter	6,000	144	72			124	62	3,400	18	Behind	4	Pairs	4.0	5.0	30.0	Stromberg	Bosch	Force Feed
White	6,000	159	77	246	81	144	65	6,000	15	Behind	4	Block	4.7	5.1	30.0	Own	Bosch	Spl. & F. F.
Wilcox	6,000	168	70	234	76	126	62	5,400	12	Side	4	Pairs	4.2	4.5	30.0	W. Bennett	Bosch	Splash
Winkler	6,000	168	72	240	72	120	60		15	Above	4	Pairs	5.0	5.0	45.0	Schebler	Splitdorf	Spl. & F. F.

6,001 to 8,000 Pounds :

CAR	Capacity	Length	Width	Overall Length	Overall Width	Wheelbase	Tread	Weight Chassis	Maximum Speed	Driver's Seat	Number Cylinders	How Cast	Bore	Stroke	Power	Carburetion	Ignition	Lubrication
Alco	7,000	....		211	80	126	68	5,500	12	Above	4	Pairs	5.0	6.0	46.0	Float Feed	Bosch	Spl. & F. F.
G-M-C Reliance	7,000	170	64	220	84	138	65	6,500	14	Above	4	Pairs	5.5	5.5	40.0	Schebler	Mea	Splash
Knickerbocker	7,000	144	78	192	72	116	60	5,200	15	Above	4	Sep	4.5	5.0	35.0	Optional	Bosch	Splash
Packers	7,000					150	62	6,000	14	Behind	4	Sep	5.2	6.0	50.0	Float Feed	Splitdorf	Spl. & F. F.
Walter	7,000					154	62	4,400	18	Above	4	Pairs	4.0	5.0	30.0	Stromberg	Bosch	Mechanical
Commer	8,000	144	66	240	73	132	62	5,100	20	Behind	4	Pairs	4.3	5.5	30.0	Own	Bosch	Pump
Eclipse	8,000					144	62	5,300	20	Above	4		4.5	5.5	45.0	Stromberg	Bosch	
Knox	8,000	156	72			149	69	7,000	12	Above	4	Sep	5.0	4.7	40.0	Stromberg	Bosch	Force Feed
Peerless	8,000					151		6,900	12.3	Behind	4	Pairs	4.5	6.5		Own	Bosch	Splash
Saurer	8,000			236	80	153	64	5,700	14	Behind	4	Pairs	4.3	5.5	30.0	Own	Eisemann	Force Feed
Speedwell	8,000	150	78	224	88	115	64	5,500	12	Above	4	Pairs	5.0	5.0	40.0	Schebler	Eisemann	Force Feed
Stegeman	8,000	147				155	68	6,000	10			Pairs	4.5	5.5				
Sternberg	8,000	168	72	246	84	150	68	7,500	12	Above	4	Pairs	5.2	8.0	50.0	Schebler	Optional	Force Feed

8,001 to 10,000 Pounds :

CAR	Capacity	Length	Width	Overall Length	Overall Width	Wheelbase	Tread	Weight Chassis	Maximum Speed	Driver's Seat	Number Cylinders	How Cast	Bore	Stroke	Power	Carburetion	Ignition	Lubrication
Alco	10,000	168		255	90	144		7,800	9	Above	4	Pairs	5.0	6.0	40.0	Newcomb	Bosch	Spl. & F. F.
American	10,000	156	66		72	130	62		10	Above	4	Sep	5.2	6.0	60.0	Float Feed	Bosch	Splash
Barker	10,000	168	72		76	150	64	5,900	11	Behind	4	Pairs	5.0	4.7	40.0	Mayer	Optional	Splash
DeDion	10,000	144	72	250	80	150	67	6,200	18	Behind	4	Sep	4.7	5.5	35.0	Own	Bosch	Own & F. F.
Gaggenau	10,000	168	75	228	76	162	66	5,400	15	Behind	4	Pairs	4.1	5.9	30.0	Float Feed	Bosch	Spl. & F. F.
Garford	10,000	144	68					6,400	10	Above	4	Block	4.2	5.2	30.0	Float Feed	Bosch	Spl. & F. F.
G-M-C	10,000	170	64	220	87	148	69	7,000	9.5	Above	4	Pairs	5.0	5.0	40.0	Schebler	Mea	Splash
Grabowsky	10,000					156	79		10	Above	4	Pairs	5.2	5.7	44.1	Float Feed	Bosch	Spl. & F. F.
Gramm	10,000	156	60	206		130	72	7,000	12	Above	4	Pairs	5.0	5.0		Rayfield	Optional	Spl. & F. F.
Hewitt	10,000	168	80	228	85	138	68	9,200	10	Side	4	Pairs	4.2	6.0	40.0	Own	Bosch	Splash
Johnson	10,000	153	62	204	87	142	72	6,500	10	Above	4	Pairs	5.0	5.5	50.0	Stromberg	Optional	Splash
Kissel-Kar	10,000	168				156	69	6,000		...	4		4.7	5.0	50.0	Stromberg	Bosch	Splash
Knickerbocker	10,000			204	72	122	66	6,000	14	Above	4	Sep	4.7	5.2	40.0	Optional	Bosch	Splash
Knox	10,000	168	72			149	71	8,000	12	Above	4	Sep	5.5	5.5	48.0	Stromberg	Bosch	Force Feed
Kopp	10,000	156	72	204	84	126	68	7,000	12	Above	4	Sep	5.2	6.0	60.0	Float Feed	Bosch	Spl. & F. F.
Locomobile	10,000					140	70	.....	8.5	Above	4	Pairs	5.0	6.0	45.0	Own	Bosch.	Splash
Lozier	10,000	152	72	199		134	70		13	Above	4	Pairs	4.2	6.5	45.0		Bosch.	Spl. & P.
Mack	10,000	168	72	230	88	144	72	7,200	10	Above	4	Pairs	5.5	6.0	18.0	Own	Bosch	Spl. & F. F.
Mais	10,000			242		154	66.5		8	Behind	4	Pairs	4.3	6.5	38.0	Rayfield	Eisemann	Spl. & F. F.
Moeller	10,000	174	72	228	72	138	65	6,650	10	Above	4	Sep	4.5	5.0	32.3	Stromberg	Bosch	Spl. & F. F.
Morgan	10,000	168	62	222	78	144	65	7,800	10	Side	4	Block	5.0	5.0	40.0	Special	U. & H.	Spl. & F. F.
Peerless	10,000					174		7,600	10.7	Behind	4	Pairs	4.5	6.5		Own	Bosch	Splash
Pierce-Arrow	10,000					156	69		15	Behind	4	Pairs	4.8	6.0	48.0	Float Feed	Bosch	Spl. & F. F.
Remington	10,000			246	69	162	61		12	Above	4	Pairs	4.8	6.0	48.0	Float Feed	Optional	Force Feed
Sampson	10,000	168	72	242	90	155	72	8,500	10	Above	4	Pairs	5.0	1.5	40.0	Float Feed	Magneto	Force Feed
Schleicher	10,000					156	70		20	Behind	4	Pairs			40.0	Stromberg	Optional	Force Feed

COOLING		TRANSMISSION					TIRES			SPRINGS			BRAKES			
Circulation	Radiator	Clutch	Form	Speeds	Location	Final Drive	Front	Rear	Front Axle	Front	Rear	Steering	Emergency	Service	Frame	Retail Price
Pump	Vertical	Cone	Select	3	Amidship	Chs	32x4	34x5	I-beam	Semi-ell	Platf	Ross	Hubs	J. S	Channel Steel	
Pump	H'comb	Opt	Select	3		Chs	36x4	36x4 D	I-beam	Semi-ell	Semi-ell	Worm	Hubs	J. S	Channel Steel	2,900
Pump	H'comb	Cone	Select	3	With Jacksh	Chs	36x3.5	36x5 or 6	Square	Semi-ell	Platf		Hubs	Hubs	Channel Steel	3,000
Pump	H'comb	Cone	Select	3	Amidship	Worm	36x3.5	36x4	I-beam	Semi-ell	Platf	Gemmer	Hubs	Shaft	Pressed Steel	3,250
C Pump	Tubular	Disc	Select	3	Amidship	Chs	34x4	38x3.5 D	Square	Semi-ell	Semi-ell	W & N	J S	Hubs	Wood & Steel	3,000
Thermo	Tubular	Exp	Prog	3	With Motor	Shaft	36x4	36x3.5 D	Tubular	Semi-ell	Semi-ell	Own	Shaft	Shaft	Nickel Steel	
Pump	Tubular	Disc	Select	3	Amidship	Chs	36x4	36x4 D	I-beam	Semi-ell	Semi-ell	Own	Hubs	Hubs	Channel Steel	
Pump	H'comb	Disc	Select	3	Amidship	Chs	x5	x4 D	Double	Semi-ell	Dbl.-ell.	Own	Hubs	J S	Steel Bars	3,200
Pump	H'comb	Disc	Select	3	With Jacksh	Chs	36x3.5	36x4 D	I-beam	Semi-ell	Semi-ell	Spl	J S	Hubs	Channel Steel	3,200
Pump	H'comb	Disc	Select	3	Amidship	Chs	36x3	36x3.5 D	I-beam	Full-ell	Platf	Own	Hubs	J. S	Channel Steel	3,300
Pump	H'comb	Disc	Select	3	Amidship	Chs	36x5	36x4 D	I-beam	Semi-ell	Semi-ell	Ross	Hubs	J S	Channel Steel	
Thermo	Tubular	Disc	Select	3	Amidship	Chs	36x5	36x3.5 D	Rect	Semi-ell	Semi-ell	S & N	Hubs	J S	Channel Steel	3,000
C Pump	Tubular	Disc	Select	3	Amidship	Chs	36x4	36x4		Semi-ell	Platf	Ross	Hubs	J S	Channel Steel	3,000
Thermo	Tubular	Cone	I Cl	3	Amidship	Chs	34x4	34x4 D	Round	Semi-ell	Semi-ell	Own	Hubs	Shaft	Pressed Steel	5,000
Pump	Tubular	Disc	Select	3		Shaft	36x5	36x4 D	I-beam	Semi-ell	Platf	Ross	Hubs	J S	Channel Steel	3,500
C Pump	Tubular	Cone	Select	3	Amidship	Chs	36x4	36x4.5 D	I-beam	Semi-ell	Semi-ell	Own	Hubs	J. S	Channel Steel	3,500
Pump	Vertical	Cone	Select	3	Amidship	Chs	36x5	40x4 D	Square	Semi-ell	Semi-ell	Own	Hubs	J. S	Channel Steel	3,400
Pump	H'comb		Select	3	With Motor	Chs	36x5	40x4 D	I-beam	Semi-ell	Platf	W & N	Hubs	J S	Channel Steel	
Pump	Tubular	Disc	Select	4	Amidship	Chs	36x5	36x4 D	Square	Semi-ell	Semi-ell		Hubs	J. S	Channel Steel	3,500
C Pump	Tubular	Disc	Select	3	Amidship	Chs	34x5	38x4 D	Square	Semi-ell	Semi-ell	W & N	J S	Hubs	Channel Steel	3,400
Thermo	H'comb	Cone	Plan	2	Amidship	Chs	34x5	34x4 D	Square	Semi-ell	Semi-ell	Own	Hubs	J. S	Channel Steel	3,000
Pump	H'comb	Cone	Select	3	Amidship	Chs	36x4	36x4		Semi-ell	Semi-ell	Own	J S	Hubs	Channel Steel	2,500
Pump	H'comb	Plate	Select	3	With Motor	Chs	36x4	36x5	I-beam	Semi-ell	Semi-ell	Gemmer	Hubs	J. S	Channel Steel	3,500
Pump	Tubular	Disc	Select	3	With Motor	Chs	36x5	36x4 D	Rect	Semi-ell	Platf	Ross	Hubs	J. S	Channel Steel	3,250
Pump	Tubular	Cone	Select	3	Amidship	Shafts	34x5	34x5	Tubular	Semi-ell	Platf	Ross	Hubs	Hubs	Channel Steel	3,500
Air		Disc	Select	4	Amidship	Chs	36x4	38x4 D	I-beam	Semi-ell	Platf	Ross	Hubs	J. S	Channel Steel	
C Pump	H'comb	Cone	Select	4	Amidship	Chs	36x4	36x4 D	I-beam	Semi-ell	Semi-ell		Hubs	J S	Channel Steel	3,350
C Pump	Tubular	Plate	Select	3	With Jacksh	Chs	36x5	36x5 D	I-beam	Semi-ell	Semi-ell	Ross	Hubs	J S	Channel Steel	
Pump	H'comb	Opt	Select	3	Amidship	Chs	36x5	36x4 D	I-beam	Semi-ell	Semi-ell	W & N	Hubs	J S	Channel Steel	
Pump	Vertical		Friction			Chs	36x4	36x6	I-beam	Semi-ell	Semi-ell	Ross	Hubs	J. S	Channel Steel	3,000
Pump	H'comb	Disc	Select	4	With Jacksh	Chs	38x5	38x4 D	I-beam	Semi-ell	Semi-ell	Ross	J S	Hubs	Channel Steel	3,200
Pump	Tubular	Cone	Select	3	With Jacksh	Chs	34x4	36x4 D		Semi-ell	Semi-ell	Ross	Hubs	Hubs		3,250
Thermo	Tubular		Select	3	With Motor	Chs	34x4	34x4 D	I-beam	Semi-ell	½ Platf	Own	Hubs	J S	Channel Steel	3,200
G Pump	H'comb	Cone	Select	3	With Jacksh	Chs	36x5	36x4 D	Square	Semi-ell	Platf	Own	Hubs	J S	Channel Steel	4,000
Pump	H'comb	Disc	Select	3	Amidship	Chs	36x5	36x4 D	D. Forged	Semi-ell	Semi-ell	Ross	Hubs	J S	Channel Steel	3,500
Pump	Tubular	Plate	Select	3	Amidship	Chs	34x5	34x4 D	I beam	Semi-ell	Semi-ell	Ross	Hubs	J S	Channel Steel	3,500
C. Pump	Tubular	Plate	Prog	3	With Jacksh	Chs	34x4	36x4 D	Rect	Semi-ell	Semi-ell	Own	Hubs	J S	Channel Steel	3,400
Pump	Tubular	Cone	Select	4	Amidship	Chs	36x4	40x4 D	I beam	Semi-ell	Semi-ell	Own	Exp	J S	Channel Steel	
Pump	H'comb	Disc	Select	2	Amidship	Chs	36x2.5	42x3	I-beam	Full-ell	Full-ell		Hubs	Trans	Channel Steel	3,400
C Pump	Tubular	Cone	Select	3		Chs	36x5	36x4 D	I-beam	Semi-ell	Semi-ell		Hubs	J S&T	Channel Steel	3,250
Thermo	Tubular	Disc	Select	3	Amidship	Chs	34x4	36x4 D	I-beam	Semi-ell	Semi-ell	W & N	Hubs	Hubs	Pressed Steel	
C Pump	H'comb	Cone	Select	3	Amidship	Chs	36x4	36x4 D	I-beam	Semi-ell	Semi-ell	Barnes	Trans	Hubs	Channel Steel	2,900
Pump	H'comb	Cone	Select	4	Amidship	Chs	34x	34x	I-beam	Semi-ell	Semi-ell	Ross	J S	J S	Channel Steel	4,000
Pump	Tubular		Friction		Amidship	Chs	36x5	36x3.5 D	I-beam	Semi-ell	Platf	Own	Trans	Hubs	Channel Steel	3,500
						Chs	36x4	38x4 D				W & N				3,500
Pump	Tubular	Disc	Select	3	Amidship	Chs	40x4	40x5	Forged	Semi-ell	Platf	Poster	Hubs	J S	Channel Steel	3,000
Pump	Tubular	Plate	Select	3	Amidship	Chs	36x5	36x4 D	I-beam	Semi-ell	Semi-ell	Ross	Hubs	J S	Channel Steel	3,000
Pump	Tubular		Friction	4	Amidship	Chs	42x5	42x5	Square	Semi-ell	Platf	Ross	Rever	Hubs	Steel	2,000
Pump	H'comb	Disc	Select	3	Amidship	Chs	36x5	40x5 D	I-beam	Semi-ell	Semi-ell	Own	Hubs	J S	I-beam	3,500
Pump	H'comb	Disc	Select	3		Chs	36x6	36x4 D	I beam	Semi-ell	Semi-ell	Worm	Hubs	J S	Channel Steel	3,450
C Pump	H'comb	ExpCone	Select	3	With Jacksh	Chs	36x4	42x4	Forged	Semi-ell	Platf		Hubs	Hubs	Channel Steel	3,400
G Pump	H'comb	Cone	Select	4	Amidship	Chs	36x5	40x4 D	Forged	Semi-ell	Platf	W & S	J S	Hubs	Channel Steel	3,700
Pump	Tubular	Cone	Select	3	Amidship	Chs	36x4	36x3.5 D	I-beam	Full-ell	Platf	Warner	Hubs	J. S	Channel Steel	3,000
G Pump	Tubular	Disc	Select	3	Amidship	Chs	36x5	36x3.5 D	Square	Semi-ell	Platf		Hubs	J. S	Channel Steel	4,000
Pump	Tubular	Disc	Select	3	Amidship	Chs	36x4	36x4 D	I-beam	Semi-ell	Semi-ell	Own	Hubs	J. S	Channel Steel	3,650
C Pump	Tubular	Disc	Prog	3	With Jacksh	Chs	36x3	36x4 D	I-beam	Semi-ell	Semi-ell	Ross	Hubs	J. S	Channel Steel	3,500
G Pump	H'comb	Cone	Select	3	Amidship	Chs	36x3	36x4 D	I-beam	Semi-ell	Semi-ell	Own	Hubs	J. S	Channel Steel	3,500
C Pump	Tubular	Disc	Select	3	With Jacksh	Chs	36x5	36x4 D	I-beam	Semi-ell	Semi-ell	Ross	Hubs	J S	Channel Steel	3,400
C Pump	Tubular	ExpCone	Select	3	With Jacksh	Chs	36x5	42x5 D		Semi-ell	Platf	W & G	Hubs	Hubs	Channel Steel	
Pump	Tubular	Cone	Spl	3	Amidship	Chs	34x4.7	34x4.7 D	Round	Semi-ell	Semi-ell	W & S			Channel Steel	5,500
	Tubular	Cone	Select	3	With Jacksh	Chs	36x5	36x4 D	I-beam	Semi-ell	Platf	Ross	Hubs	J S	Channel Steel	
C Pump	Tubular	Plate	Select	3	With Jacksh	Chs	36x6	36x6 D	I-beam	Semi-ell	Semi-ell	Ross	Hubs	J. S	Channel Steel	4,000
G Pump	Tubular	Cone	Select	4	Amidship	Chs	36x5	42x5 D	I-beam	Semi-ell	Semi-ell	Own	Exp	J S	Channel Steel	
C Pump	H'comb	Cone	Select	4	Amidship	Chs	36x5	42x5 D	Square	Semi-ell	Semi-ell	Own	Hubs	M&JS	Channel Steel	5,000
Pump	H'comb	Cone	Select	3	Amidship	Chs	36x5	36x5 D	I-beam	Semi-ell	Semi-ell	Ross	J. S	Hubs	Channel Steel	3,500
							36x5	40x5 D								3,950
Thermo	H'comb	Disc	Select	3	Amidship	Chs	36x	36x D	I-beam	Semi-ell	Platf	Ross	J S	Hubs	Wood & Steel	3,500
C Pump	H'comb	Disc	Select	3	Amidship	Chs	36x6	42x5 E	D. Forged	Semi-ell	Semi-ell	Own	Hubs	J S	Channel Steel	4,750
Pump		Cone	Plan	2	Amidship	Chs	36x7	36x5 E	I-beam	Semi-ell	Platf	Ross	Hubs	J S	Wood & Steel	4,500
	H'comb	Disc	Select	3	With Jacksh	Chs	36x4	36x4 E	I-beam	Semi-ell	Semi-ell	Spl	J. S	Hubs	Channel Steel	3,700
Pump	Tubular	Disc	Select	3	Amidship	Sh G	36x5	38x5 E	I-beam	Semi-ell	Semi-ell	Own	Hubs	Shaft	Wood & Steel	5,500
Pump	Tubular	Disc	Select	4	Amidship	Chs	33x3.9	36x4.7 E	Forged	Semi-ell	Semi-ell	Own	Hubs	J S	Nickel Steel	5,250
Pump	Tubular	Cone	Select	4	Amidship	Chs	36x6	36x6 D	Square	Semi-ell	Semi-ell	Own	Hubs	J S	Pressed Steel	4,500
C Pump	Tubular	Disc	Prog	3	With Jacksh	Chs	36x6	36x4 D	I-beam	Semi-ell	Semi-ell	Ross	Hubs	J S	Channel Steel	4,400
Pump	H'comb	Disc	Select	3	With Motor	Chs	38x6	40x4 E	I-beam	Semi-ell	Platf	W & N	Hubs	J S	Channel Steel	
Pump	Tubular	Disc	Select	4	Amidship	Chs	36x5	40x5 D	Square	Semi-ell	Semi-ell	D Scr	Hubs	J S	Channel Steel	4,500
Pump	H'comb	Cone	Plan	2	Amidship	Chs	36x4	36x5 E	I-beam	Semi-ell	Semi-ell	Own	Hubs	J S	Pressed Steel	5,000
Pump	H'comb	Cone	Select	3	Amidship	Chs	36x5	36x4.5 D	D. Forged	Semi-ell	Semi-ell	Own	J S	Hubs	Channel Steel	3,200
		Cone	Select	4	With Jacksh	Chs	36x5	40x6 D	I-beam	Semi-ell	Semi-ell	W&DN	Hubs	J S	Channel Steel	4,350
Pump	H'comb	Cone	Select	3	Amidship	Chs	36x6	36x6 D	I-beam	Semi-ell	Semi-ell	Own	Hubs	J S	Channel Steel	4,500
C Pump	Tubular	Plate	Select	3	With Jacksh	Chs	36x6	40x6 D	I-beam	Semi-ell	Semi-ell	Ross	Hubs	J S	Channel Steel	4,500
Pump	H'comb	Disc	Select	3	Amidship	Chs	36x6	36x5 D	I-beam	Semi-ell	Semi-ell	W & N	Hubs	J S	Channel Steel	
Pump	H'comb	Disc	Select	4	Amidship	Chs	40x6	40x6 D	I beam	Semi-ell	Semi-ell		Hubs	J. S	I beam	
Opt	Tubular	M Disc	Select	4	Amidship	Chs	36x5	40x5 D	I beam	Semi-ell	Platf		Hubs	J. S	Pressed Steel	4,800
C Pump	H'comb	Cone	I Cl	3	With Jacksh	Chs	36x6	36x5 D	Square	Semi-ell	Platf	Own	Hubs	J. S	Channel Steel	4,800
Pump	Tubular	Exp	Prog	3	With Motor	Shaft	36x	42x	Tubular	Semi-ell	Semi-ell	Own	Shaft	Shaft	Channel Steel	
Pump		Disc	Select	4	Amidship	Chs	36x5	36x5 D	D. Forged	Semi-ell	Semi-ell	Ross	Hubs	Hubs	Channel Steel	4,500
Pump	H'comb	Plate	Select	3	Amidship	Chs	36x6	35x5 D	I-beam	Semi-ell	Semi-ell	Ross	Hubs	J S	Channel Steel	4,750
G Pump	Tubular	Cone	Select	4	Amidship	Chs	38x6	42x6 D	I-beam	Semi-ell	Semi-ell	Own	Exp	J S	Channel Steel	
Pump	H'comb	Cone	Select	3	Amidship	Worm	36x5	40x6 D	I-beam	Semi-ell	Semi-ell	Own	Hubs	Trans	Pressed Steel	4,500
Pump	H'comb		Hydr		Amidship	Chs	36x5	36x5 D	I-beam	Semi-ell	Semi-ell	Own	Hubs	Hydr	Pressed Steel	5,000
Thermo	Tubular	Cone	Select	4	Amidship	Chs	36x6	36x6 D	I-beam	Semi-ell	Semi-ell	W & N	Hubs	Shaft	Pressed Steel	
C Pump	H'comb	C Plate	Select	4	Amidship	Chs			I-beam	Semi-ell	Full-ell	Gemmer	Hubs	J S	Channel Steel	5,000

Durable Dayton, Three-Ton Commercial Car
Knox Three-Ton Vehicle in Brewery Service
Kissel-Kar Truck of Three Tons Capacity
Packers New 3.5-Ton Wagon
Salentine & Libby, a Three-Ton Chicago Carrier

cones 97. The adherents of the simple conical type are about the same as last year, while the former include some 21 disc clutches used with planetary transmissions. Eliminating these because the latter almost necessitates a plate form, the relative standings of disc and cone become about 120 and 97. The passing of the progressive method of shifting gears may be noted in the small number, nine, listed.

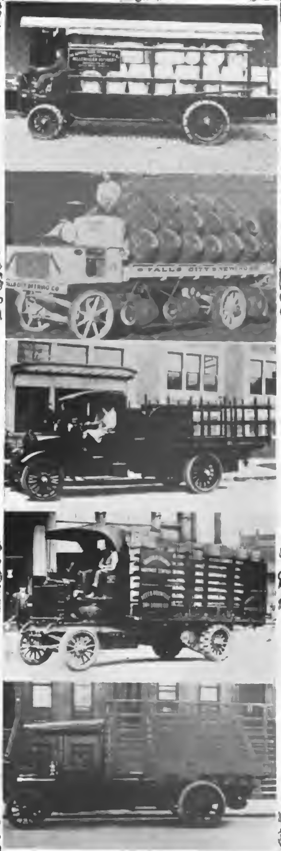
The grouping of the units cannot be said to have progressed sufficiently to evolve a tendency. Transmissions are still found placed directly back of the motor on the rear axle, and in every possible position between. Clutches are found in a unit with the motor, with the gearbox and in intermediate locations. The unit power plant has not made the strides forward which were expected of it and which follow logically from a statement of this form's advantages. On the larger and heavier carriers the greatest number have that disposition in which the engine and clutch form a forward unit while the transmission and differential make up a second one near the rear end, final drive being by double side chains of the roller type.

Double Chains for All Heavy Trucks

This last statement brings up the matter of final drive; despite one or two notable cases of the adoption of shaft drive with worm gears during the past season and a couple of equal prominence for the internal gear and double gear axle form, the chain continues to gain ground for heavy work, while the shaft is more prominent among the lighter vehicles. Among electrics the chain has almost succeeded the shaft, the 10 exceptions to the former method including no less than six special drives brought about by the location of a motor in the wheels or some similar layout. This brings the actual shaft drives down to four in 44 cars. Front and four-wheel drives are noticeable principally through absence, although a few manufacturers show their convictions by continuing the same.

NAMES AND LOCATION OF CAR MAKERS

Mais	Mais Motor Truck Co.	Indianapolis.
Sandusky	Sandusky Au. Pts. & M. T. Co.	Sandusky, O.
Sternberg	Sternberg Mfg. Co.	Milwaukee.
S & L	Salentine Libbey & Co.	Milwaukee.
United States	U. S. Motor Truck Co.	Cincinnati.
Velie	Velie Motor Vehicle Co.	Moline, Ill.
American	American Motor Truck Co.	Findlay, O.
Alco	American Locomotive Co.	New York City.
Avery	Avery Co.	Peoria, Ill.
Beaver	Beaver Motor Truck Co.	Portland, Ore.
Beck	Beck & Son	Cedar Rapids.
DeDion	DeDion Bouton Co.	New York City.
Durable Dayton	Dayton Auto Truck Co.	Dayton, O.
Gopher	Robinson-Loomis M. T. Co.	Minneapolis.
Hewitt	Metzger Motor Car Co.	New York City.
Juno	Brodesser Motor Truck Co.	Juneau, Wis.
Kelly	Kelly Motor Truck Co.	Springfield, O.



Hewitt Truck Loaded with Seven Tons of Sugar
Morgan Five-Ton Truck Handling Beer in Barrels
Pierce-Arrow Five-Ton Worm-Driven Vehicle
Sampson's Four-Ton Carrier with a Load
Saurer Vehicle with Rated Capacity of 4.5 Tons

Frames may be divided now into wood and armored wood on the one hand and some form of steel on the other. Pressed steel is gaining, although structural material holds its own. Subframes are less general, the tendency toward their elimination and the substitution of slightly longer crankcase arms being on the increase. Wheels are more nearly all wood than ever before, the steel forms having lost all previous advantage, with the possible exception of cast-steel spoked forms on a couple of makes. Users say, however, that these are harder on tires, enough of an expense without additions. To the latter makers and users alike are paying more attention, the latter realizing that he must have sufficiently large sizes to gain any success at all, while the former has been perfecting types and rubber compounds designed to give greater length of life. A number of demountable forms are now available.

Body Forms a Very Big Factor

Bodies have been given the greatest amount of thought during the past year in an effort to make the truck as a whole more efficient and economical. The result is a large number of improved and refined forms from all of the better firms as well as the carriage and wagon makers, who, scenting a golden future in this class of work, have hastened to get into it. The annual displays are expected to bring into the public gaze some new things in this line, among which may be mentioned fire apparatus, combination patrol and ambulances, dumping forms in a great variety including side, rear and center dumpers, nesting and similar forms of enclosed structures in which the body may be loaded in the absence of the chassis on deliveries, thus conserving the waiting time, and many more forms. Departing from previous wood forms, an increasingly greater amount of steel and other metals is finding use.

It is not improbable that some new ideas in the way of loading will be developed, with the resulting forms of

NAMES AND LOCATION OF CAR MAKERS

Knox	Knox Automobile Co.	Spgfield, Mass.
Modern	Modern Motor Truck Co.	St. Louis.
Morgan	Morgan Motor Truck Co.	W'rcster, Mass.
Packard	Packard Motor Car Co.	Detroit.
Seitz	Packers Motor Truck Co.	Wh'ling, W.Va.
Packers	Seitz Auto & Transmis. Co.	Detroit.
Panhard	Panhard & Levassor	New York City.
S & S	Sayers & Scovill Co.	Cincinnati.
Walter	Walter Motor Truck Co.	New York City.
Barker	C. L. Barker	Norwalk, Conn.
B-O-E	Motor Conveyance Co.	Milwaukee.
Commer	Wyckoff, Church & Partridge	New York City.
Frontenac	Abendroth & Root Mfg. Co.	N'wbu'gh, N.Y.
Kato	Four Traction Auto Co.	M'nkato, Minn.
Kopp	Kopp Motor Truck Co.	Buffalo.
Lord Baltimore	Lord Baltimore M. C. Co.	Baltimore.
Moeller	New Haven T. & A. Wks.	New Haven.

Car	Capacity	BODY		Overall Length	Overall Width	Wheelbase	Tread	Weight Chassis	Maximum Speed	Driver's Seat	POWER PLANT							
		Length	Width								Number Cylinders	How Cast	Bore	Stroke	Power	Carburetion	Ignition	Lubrication
Stearns	10,000	144	72	228	84	144	63.5		15	Behind	4	Sep.	4.7	6.0	44.1	Float Feed	Bosch	Force Feed
Victor	10,000	144	72			146	70				1	Sep.	5.2	6.0	60.0	Schebler	Bosch	Spl. & F. F.
Walter	10,000					154	62	5,000	18	Behind	4	Pairs.	4.5	6.0	40.0	Stromberg	Bosch	Mechanical

Over 10,000 Pounds :

Commer	11,000	150	78	264	84	144	70	6,600	15	Behind	4	Pairs	4.7	5.5	40.0	Own	Bosch	Pump
B-O-E	12,000	168	60	226	84	154	68		10	Side	4	Pairs	5.4	8.0	44.1	Float Feed	Splitdorf	Spl. & F. P.
Gaggenau	12,000	168	75	252	76	178	66	7,600	12.5	Behind	4	Pairs	5.3	5.9	45.0	Float Feed	Bosch	Spl. & F. P.
Knox	12,000	168	84			149	74	8,800	11	Side	4	Sep	5.5	5.5	48.0	Stromberg	Bosch	Force Feed
Speedwell	12,000	186	81	260	86	139	65	5,900	9	Above	4	Pairs	5.0	5.0	40.0	Schebler	Eisemann	Force Feed
Stegeman	12,000	150	72			156	68	5,800	10	Behind	4	Pairs.	5.0	6.0	45.0	Stromberg	Briggs	Spl. & F. P.
Alco	13,000	168		235	40	164		8,000	9	Above	4	Pairs.	5.0	6.0	40.0	Newcomb	Bosch	Spl. & F. P.
Commer	13,000	144	72	264	84	144	70	6,800	14	Behind	4	Pairs	4.7	5.5	40.0	Own	Bosch	Pump
Aries	14,000			270		156	70	9,960	10	Behind	4	Pairs	5.0	5.7	40.0	G. & A.	Bosch	Pump
Hewitt	14,000	180	84	240	85	138	68	9,600	8	Side	4	Pairs	4.2	6.0	40.0	Own	Bosch	Splash
Victor	14,000	144	72			146	72				4	Sep	5.0	6.5	60.0	Schebler	Bosch	Spl. & F. F
Remington	15,000			246	69	162	61		10	Above	4	Pairs	4.8	6.0	38.0	Float Feed	Optional	Force Feed
Hewitt	20,000	180	90	240	94	138	68	12,000	7	Side	4	Pairs.	4.2	6.0	40.0	Own	Bosch	Splash
Moore	20,000	192	84	246	88	135	65	10,200	12	Above	4	Pairs	5.0	6.0	45.0	Schebler	Bosch	Spl. & F. P.
Remington	20,000			246	69	162	61		8	Above	4	Pairs.	4.8	6.0	38.0	Float Feed	Optional	Force Feed
Victor	20,000	168	72			158	72				4		5.7	6.0	75.0	Schebler	Bosch	Spl. & F. P.

Municipal Sight-seeing and Special Forms :

Beck 15 Passenger		120	72	192	72	130	56		20	Behind	4	Sep	4.5	5.5	40.0	Schebler	Remy	Splash
Franklin 5 Passenger						122	53.5	2,000	30	Behind	4	Sep	4.0	4.0	18.0	Float Feed	Bosch	Spl. & F. P.
Great Eagle Ambulance		90	48			135	56			Behind	4	Sep	4.7	5.0	50.0	Stromberg	Remy	G. P.
Great Eagle Ambulance		90	48			138	56			Behind	6	Sep	4.2	5.1	60.0	Stromberg	Remy	G. P.
Knox Combination-Hose						170	70.7	9,000	30	Above	6	Sep	5.0	5.5	60.0	Stromberg	Bosch	Force Feed
Knox Chemical-Hose		101	50			145	60	6,000	30	Behind	4	Sep	5.5	5.5	18.0	Stromberg	Bosch	F. P. & Pump
Luitwieler Pump				175	40	139	58		42	Above	4	Pairs	6.0	6.5	60.0	Schebler	Dual	Force Feed
Victor 15 Passenger						120	56				4		4.0	4.5	30.0		Bosch	Spl. & F. P.
Victor 20 Passenger						140	66				4	Sep	4.1	5.2	40.0		Bosch	Spl. & F. P.
Victor 24 Passenger						140	66				4	Sep	4.8	5.5	50.0		Bosch	Spl. & F. P.
Victor 30 Passenger						140	66				4	Sep	4.8	3.5	50.0		Bosch	Spl. & F. P.

Gasoline Electric-Driven Vehicles :

Couple-Gear	10,000	168	72	222	78	144	66	9,000	12	Above	4	Sep	5.2	6.0	45.0	Stromberg	Bosch	Spl. & F. F
Great Western	20,000	208	80	302	99	172	77	14,000	6	Above	6		5.5	5.5		Stromberg		

Electric Motor Vehicles

CAR	Capacity	BODY		Weight	Battery	Battery Wt.	Amp.-Hours Cap.	Motor	Motor Speed	Controller
		Length	Width							
Commercial	500									
Urban	600				30 LD 11 Pl			GE-1,025 60 V 32 Amp	1,200	GE-S-103
General Vehicle	700	56	40	2,700	44 GV 9 Pl.	835	104	1020 85 V 16 Amp.	1,600	S 35 B.
Studebaker	800	83	36		Optional					
Ward	800				42			Spec. Auto Type		Under Front Seat
Argo	1,000	90	42	2,800	28 Ex 11 Pl			Westinghouse		
Baker	1,000	80	40	2,200	42 Ex 9 Pl			2.5 Horsepower Service.		
Commercial	1,000									
General Vehicle	1,000	72	41	2,950	44 11 Pl	1,255	138	1020-85 V 20 Amp	2,000	S-35-B
Detroit	1,000	75	42	2,660	60 Edis A-4			Type 17 70 V 30 Amp	1,300	14T
Urban	1,000	73	42		50 Edis A4			GE 1025 60 V 32 Amp	1,300	GES 103.
Beaver	1,500	87	40		60 Edis A6			One GE		
Studebaker	1,500	83	39		Optional					
Argo	2,000	100	42	3,400	28 Ex 13 Pl			Westinghouse		
Baker	2,000	90	42	3,000	42 Ex 9 Pl			3.5 Horsepower Service		
Commercial	2,000									
Detroit	2,000	80	48	3,400	60 Edis A6			Type 17-70 V 30 Amp	1,300	14T
General Vehicle	2,000	96	48	4,700	44 13 Pl	1,485	162	1026 85 V 28 Amp	1,200	S-35-B
Lansden	2,000			3,750	Edison	1,600				
Waverley	2,000	84	40		42 Ex 11 Pl			GE.		
Studebaker	2,500	115	43		Optional					
Waverley	2,500	156	54		42 Opt 11 Pl			2 GE		GE
Detroit	3,000	100	54	4,840	60 Edis A8			Type 18 70 V 48 Amp	1,120	19T
Lansden	3,000			4,250	Edison	1,600				
Walker**	3,000	96	41	4,400	42 Ex 11 Pl		140	One 3.5 Horsepower 80 V		
Baker	4,000	150	66	4,500	42 Ex 13 Pl			4 Horsepower Service		
Commercial	4,000	132	50	6,500	42 Ld 60 Edis			85 V 22 Amp		Cont Tor
General Vehicle	4,000	132	56	6,300	44 GV 17 Pl	1,970	216	1026 85 V 28 Amp	1,200	S 35 B
Lansden	4,000			4,900	Edison	1,600				
Studebaker	4,000	156	50		Optional					
Lansden	5,000			5,200	Edison	1,600				
Lansden	6,000			5,200	Edison	1,600				
Waverley	6,000	156	54		42 Opt. 15 Pl.			One GE		GE
American	7,000	156	60	7,500	42 Nat			2 Westinghouse		
Commercial	7,000	156	58	8,500	42 Ld 60 Edis			85 V 16 Amp		Cont Tor 4
General Vehicle	7,000	154	60	9,500	44 GV 21 Pl	2,410	270	1,022 85 V 40 Amp	1,200	S 35 B.
Studebaker	7,000	157	56		Optional					
Commercial**	10,000	192	68	10,000	42 Ld 60 Edis			85 V 16 Amp		Cont Tor
Couple-Gear**	10,000	180	60	9,000	44 Ld 21 Pl			One in each wheel		
General Vehicle	10,000	180	72	10,500	44 GV 25 Pl	2,790	324	1,022 85 V 40 Amp	1,200	S-35-B
Studebaker	10,000	169	59		Optional					

COOLING		TRANSMISSION					TIRES			SPRINGS			BRAKES			
Circulation	Radiator	Clutch	Form	Speeds	Location	Final Drive	Front	Rear	Front Axle	Front	Rear	Steering	Emergency	Service	Frame	Retail Price
Pump	H'comb.	Disc	Select	4	Amidship	Chs	34x5	38x5	D I-beam	Semi-ell	Semi-ell	Own	Hubs	J. S	Pressed Steel	$1,800
Pump	H'comb.	Disc	Select	3	....	Chs	36x6	38x5	D I-beam	Semi-ell	Semi-ell	Worm	Hubs	J. S.	Channel Steel	4,500
C Pump	H'comb	ExpCone	Select	3	With Jacksh	Chs	36x5	42x5	D	Semi-ell	Platf	W & G	Hubs	Hubs	Channel Steel	.....
Pump	Tubular	Cone	I Cl	3or4	Amidship	Chs	34x5.5	40x5.5	D Round	Semi ell	Semi ell	Own	Hubs	J S	Channel Steel	6,300
Thermo	Tubular	Disc	Select	5	Amidship	Chs	36x6	40x6	D Square	Semi ell	Semi ell	S & N	Hubs	J S	Channel Steel	6,000
Pump	Tubular	Disc	Select	4	Amidship	Chs	33x4.7	37x5.5	D N St	Semi ell	Semi ell	Own	Hubs	J S	Ch Nick St	6,000
C Pump	Tubular	Plate	Select	3	With Jacksh	Chs	36x7	42x7	D I-beam	Semi-ell	Semi ell	Ross	Hubs	J S	Channel Steel	5,000
Pump	H'comb	Cone	Select	3	Amidship	Chs	36x5.5	36x5.5	D D Forged	Semi-ell	Semi-ell	Ross	J S	Hubs	Channel Steel	4,500
Pump	H'comb	Disc	Select	4	With Motor	Chs	36x6	40x5	D Forged	Semi ell	Semi-ell	W & G	Hubs	Shaft	Channel Steel	4,000
C Pump	H'comb	Disc	Select	3	Amidship	Chs	36x7	42x6	D Forged	Semi ell	Semi-ell	Own	Hubs	J S	Channel Steel	5,200
Pump	Tubular	Cone	I Cl	3or4	Amidship	Chs	34x5.5	40x5.5	D Round	Semi ell	Semi ell	W & S	Hubs	J S	Channel Steel	6,500
Pump	Tubular	Disc	Select	3	Amidship	Chs	36x5.5	40x8	St NSt Sq.	Semi ell	Semi ell	Own	Hubs	J S	Channel Steel	6,000
Pump	H'comb	Cone	Plan	2	Amidship	Chs	36x5 D	36x6	D I beam	Semi-ell	Semi ell	Own	Hubs	J S	Pressed Steel	5,500
Pump	H'comb	Opt.	Select	3	......	Chs	36x7	42x6	D I-beam	Semi-ell	Semi ell	Worm	Hubs	J S	Channel Steel	5,500
Pump	H'comb.	...	Hydr...		Amidship	Chs	36x5	36x5	D I-beam	Semi ell	Semi-ell	Own	Hubs	Hydr	Pressed Steel	5,500
Pump	H'comb.	Cone	Plan	2	Amidship	Chs	36x5 D	44x7	D I-beam	Semi-ell	Semi-ell	Own	Hubs	Trans.	Pressed Steel	6,000
C Pump	H'comb.	M. Disc	Select	3	Amidship	Chs	42x6	42x6	D I beam	Semi-ell	Semi-ell	Ross	Hubs	J S	Channel Steel	......
Pump	H'comb.		Hydr		Amidship	Chs	36x5	36x4	D I beam	Semi ell	Semi ell	Own	Hubs	Hydr	Pressed Steel	6,000
Pump	H'comb.	Cone	Select	3	......	Chs	36x7	44x7	D I beam	Semi ell	Semi-ell	Worm	Hubs	J S	Channel Steel	6,500
Pump	Tubular	Plate	Select	3	With Motor	Chs	36x3.5	36x4	Square	Semi-ell.	Platf.	Ross	.....	.....	Channel Steel	3,000
Air	...	Disc	Select	3	Amidship	Shaft	30x4	30x4	Tubular	Full-ell	Full-ell	Own	Hubs	Trans	Wood	2,850
Pump	H'comb	Cone	Select	3	Amidship	Shaft	30x4.5	36x4.5	I-beam	.....			Hubs	Hubs	Pressed Steel	3,500
Pump	H'comb.	Cone	Select	3	Amidship	Shaft	34x4.5	36x4.5	I-beam	.....	.....		Hubs	Hubs	Pressed Steel	4,250
C Pump	Tubular	Plate	Select	3	With Jacksh	Chs	40x5	40x5	D I beam	Semi ell	Semi ell	Ross	Hubs	J S	Channel Steel	9,000
C Pump	Tubular	Plate	Select	3	With Jacksh	Chs	40x4	40x5.5	D I beam	Semi ell	Semi ell	Own	Hubs	J. S	Channel Steel	5,600
		Cone	Select	3	Amidship	Chs	x4	x5	D Forged	Semi-ell	Platf	Own			Channel Steel	9,000
G Pump	H'comb	Disc	Select	3	With Motor		34x3	34x4	D Forged	Semi-ell	Semi-ell		Hubs	J S	Channel Steel	2,750
G Pump	H'comb	Disc	Select	3			36x4	36x5	D I-beam	Semi-ell	Semi-ell		Hubs	J S	Channel Steel	3,500
G Pump	H'comb	Opt.	Select	3			36x4	36x4	D I-beam	Semi-ell	Semi-ell		Hubs	J S	Channel Steel	3,750
G Pump	H'comb	Opt	Select	3			36x4	36x3.5	D I-beam	Semi-ell	Semi-ell		Hubs	J S	Channel Steel	4,000
Pump	Tubular		Elec		......	Elec	36x4 D	36x5	D	Semi ell	Semi ell	Own	Elec	4 Whs	Channel Steel	5,600
G Pump	H'comb	24KW	Elec			Chs	48x12	48x12	I-beam	Semi ell	Semi ell.	.....	Hubs	Whs	I-beam	......

						AXLES		TIRES		BRAKES		SPRINGS			
Contr. Speeds	Wheelbase	Tread	Max. Speed	Mileage	Final Drive	Front	Rear	Front	Rear	Emergency	Service	Front	Rear	Frame	Retail Price
3 Pwd 2 Rev	85		15		Worm			36x2.5	36x2.5	Elec	Hubs	¾ ell	Semi ell	...	$1,800
4 Pwd 2 Rev	80	56	15	50	Chs	I beam	I beam	34x2.5	34x2.5	2 prs		Semi ell	Semi ell	Spl. Des	1,800
4 Pwd 2 Rev	74	52	12	45	Chs			32x2.5	32x2.5	Exp		Semi ell	Semi-ell	Channel Steel	
	84	59	11.5		Chs			36x2.1	42x2.5	Hubs		Platf.	Full-ell		
			12	40	Chs	Tubular	Tubular	30x2	30x2	Hubs		Full-ell	¾ Platf	Wood	
	86	54	12	50	Shaft	Tubular	Tubular	34x3	34x3	Exp		Semi ell	Semi-ell	Channel Steel	1,800
	85	56	14		Chs	I beam	Forged	34x3	34x3	Exp		Semi ell	Semi ell	Pressed Steel	1,900
3 Pwd 2 Rev	90		15		Worm			36x2.5	36x3	Elec	Hubs	¾ ell	Semi-ell		2,000
4 Fwd 2 Rev	81.5	54	12	45	Chs			36x2.5	36x2.5	Exp		Semi ell	Semi ell	Pressed Steel	
5 Fwd 5 Rev	80	56	14	55	Chs	I beam	Rect	32x2.5	34x3	Hubs	J S	Semi ell	Semi ell		1,300
4 Fwd 2 Rev	86	56	15	55	Chs	I beam	I beam	36x2.5	36x2.5	2 prs		Semi ell	Semi ell	Spl. Des	2,200
	93	58	12		Chs			36x3.5	36x3.5	Hubs	J S	¾ ell	Platf		2,850
	91	56	12		Chs			36x3	42x3	Hubs		Platf	Platf		
	96	54	12	45	Shaft	Tubular	Tubular	34x3.5	34x3.5	Exp		Semi ell	Semi-ell	Channel Steel	2,200
	92	56	12		Chs	I beam	Forged	34x3.5	34x3.5	Exp		Semi ell	Semi ell	Pressed Steel	2,300
4 Fwd 2 Rev	100		12		Gear			36x3.5	36x4	Elec	Hubs	Semi ell	Semi ell		2,550
5 Pwd 3 Rev	88	58	12	55	Chs	I beam	Rect	32x3	34x3.5	Hubs	J S	Semi-ell	Semi ell		1,400
4 Pwd 2 Rev	102	60	10	43	Chs	Square	Round	30x1.5	36x1.5	Exp H		Semi-ell	Semi ell	Channel Steel	
			10	55	Ch					Hubs		Semi-ell	Semi-ell	Channel Steel	
	97.5	56			Chs		Tubular	32x3	36x3	Hubs	J S	Semi ell	Full-ell		2,000
	108	58.5	9.2		Chs			36x4	42x4	Hubs		Semi ell	Semi ell		
	90	68			Chs			36x3	36x3	Hubs		Semi ell	Semi ell		
5 Pwd 3 Rev	96	62	11	50	Chs	I beam	Rect	34x3.5	36x4	Hubs	J S	Semi ell	Semi ell	Channel Steel	1,650
			9	85	Chs					Hubs		Semi-ell	Semi ell	Channel Steel	
					Gears	Tubular	Tubular	Opt		Hubs	Hubs				
	120	62	10		Gears			36x5	36x1.5d	Hubs		Semi-ell	Semi ell	Pressed Steel	3,200
4 Fwd2 Rev	116							Opt		Hubs					5,000
4 Pwd 2 Re			9	45	Chs	Round	Round	36x4	36x2.5d	Hubs		Semi ell	Semi-ell	Channel Steel	
			8	40	Chs			Opt		Hubs		Semi ell	Semi ell	Channel Steel	
	113	62.5	9.2		Chs			36x5	36x3.5d	Hubs		Semi-ell.	Semi ell	Channel Steel	
			7	45	Chs			Opt		Hubs		Semi-ell.	Semi ell	Channel Steel	
			7	40	Chs			Opt		Hubs		Semi-ell	Semi ell	Channel Steel	
	118	73			Ch			36x5	36x5	Hubs		Semi-ell	Platf	Channel Steel	
	133	62	8		Chs			36x5	36x4 D	Hubs		Semi ell	Platf	Wood & Steel	
4 Pwd 2 Rev			10		Gear			36x3.5d	36x3.5 D	Elec	Hubs	Semi ell	Semi ell		4,200
4 Pwd 2 Rev	126	63	8	10	Chs	Round	Round	36x6	36x3.5 D	Hubs		Semi ell	Semi ell	Channel Steel	
	127	71	9		Chs			36x5	36x4 D	Hubs		Semi-ell	Semi ell	Channel Steel	
4 Pwd 2 Rev	132		7	25	Gear			35x4 D	36x4 D	Elec	Hubs	Semi-ell	Semi ell		4,650
	96	72	8		Gear	Trussed	Trussed	36x4 D	36x4 D	Elec	Hubs	Semi-ell	Semi ell	I beam	5,000
4 Pwd 2 Rev	119	69	7	33	Chs	Round	Round	36x7	36x5 D	Hubs		Semi-ell	Semi ell	Channel Steel	
	126	76	7.3		Chs			36x7	36x4 D	Hubs		Semi ell	Semi-ell.	Channel Steel	

Alco Truck of a Carrying Capacity of Five Tons
DeDion Vehicle Which Also Handles Five Tons
Mack Wagon of 6,000 Pounds Carrying Ability
Moeller, a Comparatively New Five-Ton Carrier
Peerless Five-Ton Vehicle Handling Tile

body. Thus overhead filling would necessitate a different form entirely than one loaded from the more usual side or rear. Similarly chutes, cranes and other adjuncts to the body cannot help but have an influence upon its size, shape and construction.

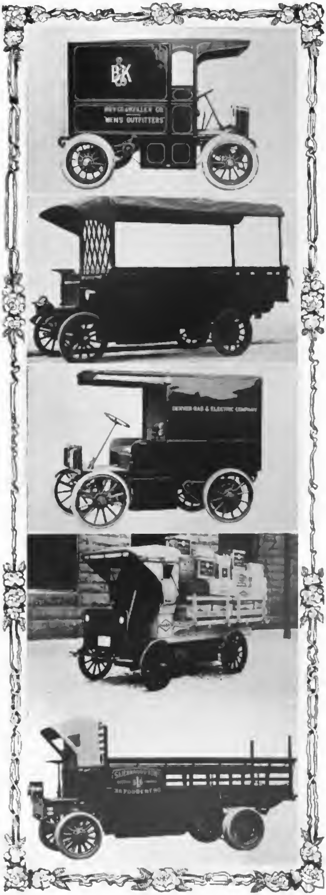
Novelties in construction should not be neglected simply because they are novel and different. Thus, to cite a single instance, the use of the three-wheeled tractor with power plant and provision for a fifth wheel on the rear platform is going to solve many of the problems of the little fellow who cannot afford to sacrifice or give away his wagons. Using one of these three-wheelers, he can sell his horses for a fair price, remove the front wheels of his wagons and place the forward end upon the power unit. The whole thus becomes a five-wheeled motor truck, the single front wheel forming the turning member, while the fifth wheel allows of a second radius point in the group and in this way shortens the length required to turn the vehicle. Although a makeshift in some senses of the word, it fills all of the requirements, lessens the initial expense of the truck as such and minimizes the merchant's loss in changing from horse to power. In this, too, it gives the vehicle a better chance to make good, for it is not burdened with the total loss by the change as is the case in many instances, making a favorable showing difficult in the most favorable circumstances otherwise.

Miscellaneous Parts Show Attention

Many miscellaneous items have had specific attention during the year, as the matter of adjustable pedals and levers to suit men of varying stature and consequent length of limb and arm. So, too, in the matter of steering wheels, as to diameter position relative to the seat, size of section, angle of inclination of post, etc. All of these factors must enter into the driver's comfort and it is undeniable that a well satisfied chauffeur or mechanic takes better care of his vehicle than one who is disgruntled for any reason, real or fancied. Looking after

NAMES AND LOCATION OF CAR MAKERS

Peerless	**Peerless Motor Car Co.**	**Cleveland.**
Pope-Hartford	**The Pope Mfg. Co.**	**Hartford, Ct.**
Schleicher	**Schleicher Motor Veh. Co.**	**Ossining, N.Y.**
Universal	**Universal Motor Truck Co.**	**Detroit.**
Knickerbocker	**Knickerbocker M.T.Mfg.Co.**	**New York City.**
Saurer	**International Motor Co.**	**Plainfield, N. J.**
Speedwell	**Speedwell Motor Car Co.**	**Dayton, O.**
Gaggenau	**Benz Auto Import Co.**	**New York City.**
Pierce-Arrow	**Pierce-Arrow M. C. Co.**	**Buffalo.**
Remington	**Remington Standard M. Co.**	**New York City.**
Stearns	**F. B. Stearns Co.**	**Cleveland.**
Aries	**J. Jaccard & Co.**	**New York City.**
Moore	**F. L. Moore Co.**	**Los Angeles.**
Great Eagle	**United States Carriage Co.**	**Columbus, O.**
Luitweiler	**Luitweiler Pump. Eng. Co.**	**Rochester.**



Urban Electric Delivery Wagon of 600 Pounds Capacity
Baker Electric Vehicle Which Handles Two Tons
General Vehicle Electric Wagon of 700-Pound Load
Detroit Electric Car with 2000 Pounds of Provisions
General Vehicle Truck Which Can Haul Five Tons

these items when buying the vehicle brings the merchant his return in the greater mileage, lessened repair expense and other items produced by the satisfied and comfortable driver as compared with a mere time server or one continually in a bad humor because of defects in the truck design or construction.

Devices intended to lessen the driver's work and responsibility are destined to play a large part in the very near future, as for instance self-starters, governors, fixed spark constructions, airbrakes, telltales for all ignition, lighting and lubrication systems and other similar items. In purchasing, the application of these to the vehicle or the attitude of the car builder toward them should be ascertained as well as the advantages claimed. In these and many other ways the prospective buyer should examine the cars of 1912 with exceeding care, not so much to discover flaws as to get the latest and best in everything, and thus gain the advantages of efficiency and economy.

Where Shall the Driver Be Located?

The matter of driver's location, above or behind the motor, seems not to have been settled in favor of either. Both sides have had numerous converts among the new vehicles of the past season, while a growing number seem to have compromised on the situation alongside in which all of the advantages of each of the others are available. The single disadvantage of this lies in the exceeding width of frame and vehicle. As to the right or left hand control, following the agitation of this question by the engineers last winter and the preceding summer, the latter has gained ground rapidly. On the subject of right or left hand operation of levers, however, there is still some discussion, many makers doubting if any driver can ever learn to operate these with his left hand as dextrously as with the more usual right. On those cars having left-hand control the levers are positioned in the center of the footboard, which has the additional merit of permitting entrance and exit on the curb side, or, in fact, on either side.

NAMES AND LOCATION OF CAR MAKERS

Couple-Gear	Couple-Gear Fght.-Wh'l Co.	Grand Rapids.
Great Western	Great Western Trans. Co.	Chicago.
Urban	Kentucky Wagon Co.	Louisville
General Vehicle	General Vehicle Co.	L. I. City, N. Y.
Studebaker	Studebaker Automobile Co.	Cleveland.
Ward	Ward Motor Vehicle Co.	New York City.
Argo	Argo Electric Vehicle Co.	Saginaw, Mich.
Baker	Baker Motor Vehicle Co.	Cleveland.
Detroit	Anderson Electric Car Co.	Detroit.
Beaver	Beaver Motor Truck Co.	Portland, Ore.
Lansden	Lansden Co.	Newark, N. J.
Waverley	Waverley Co.	Indianapolis.
Walker	Walker Vehicle Co.	Chicago.
Commercial	Com. Truck Co. of America	Philadelphia.
American	American Motor Truck Co.	Findlay, O.

Traffic Congestion Problems

NOW that the commercial vehicle may be said to have fairly proved its worth in the transportation of the world's goods, a number of problems previously considered subordinate have assumed a very large proportion. Among those which necessitate immediate solution is an alteration of traffic handling as under the present methods in vogue or an entirely different attitude on the part of truck manufacturers and merchant users of their products acting as a unit.

The first might be set down as a change in municipal attitude, while the latter is distinctly a user's proposition. Due to the present inertia of both parties, although the latter is seeking the results which such a change would bring about, nothing is being accomplished. The answer will only be produced by users and manufacturers of vehicles combining to force the changes upon the other side as represented by municipal officials who see no need for a change and horse owners and users who oppose any.

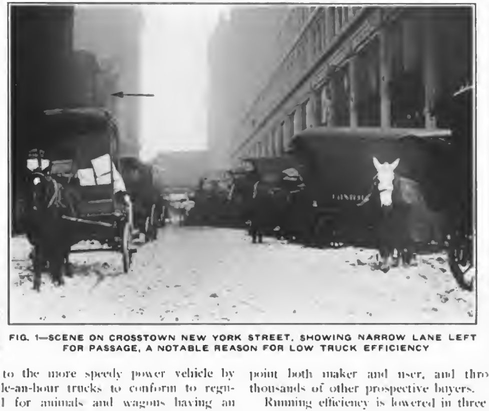


FIG. 1—SCENE ON CROSSTOWN NEW YORK STREET, SHOWING NARROW LANE LEFT FOR PASSAGE, A NOTABLE REASON FOR LOW TRUCK EFFICIENCY

It is admitted by all concerned that the present trouble has been brought about by the application of horse methods to the more speedy power vehicle by requiring 15-mile-an-hour trucks to conform to regulations designed for animals and wagons having an absolute maximum ability of four to five miles per hour, by insisting that the unit which can do its 50-60 ton-miles a day be made to conform to rules laid down for the delivery of the same by some three or four different units.

A three-ton truck does not handle any more load on each trip than a three-ton horse wagon, unless its owner is unwise enough to allow of overloading on the assumption that the motor can pull as much as is piled on, and similarly with any other rated capacity, the load for each unit is the same whatever the power used to draw it. Where the commercial car does overtop the horse lies in its speed. In this it has a three or four to one advantage. This speed is only manifest when the power wagon is upon the streets, either delivering or returning from work light; when it is loading or unloading it not alone has no advantage over the horse but possesses the inherent disadvantage that its greater cost and consequent hourly and daily charges make an equal wait a greater financial loss.

This means that the loading and unloading time must be reduced for two reasons, one of importance to the vehicle's maker and both vital to its success and standing with the owner. These are: A saving to put it on a par with the horse by reducing the lost time to such a figure as to offset the higher hourly charges, this being the reason for its use which interests both maker and user; and the further saving to improve its efficiency over the horse, this carrying the greatest weight with the user but being of secondary import to the car builder. But of this loading and unloading proposition, it must be stated that it is too big a proposition to consider in any other than a separate article. The present writing will consider only the running congestion which reduces the admitted superiority of the vehicle, and thus makes it disappoint both maker and user, and through the latter thousands of other prospective buyers.

Running efficiency is lowered in three ways—namely, by slower traffic obstructing its actual progress on the streets; by standing vehicles reducing the width and area of the passage in such a way as to prevent the vehicles from proceeding with their customary speeds, in cases causing actual stops for a long time, and by methods of loading which superinduce the clogging of already narrow streets by standing wagons or other trucks. A secondary item which would come under the first heading might be given as car tracks, elevated railroad pillars, snow or other street sweepings in piles, obstructions due to contractors or others disturbing the pavement of seriously congested streets.

A contemporary print relates an efficiency story which proves some of these points. A certain business had

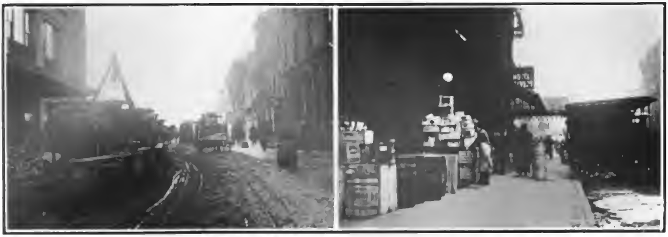


FIG. 2—TWO TRAFFIC OBSTRUCTION VIEWS; AT LEFT, SAME AS FIG. 1, BUT IN OPPOSITE DIRECTION; AT RIGHT, DIFFERENT STREET SHOWING USE OF SIDEWALK

every reason for success, but was not paying dividends. It was located in a small suburb, where it had much light and air, considerable space, low rents and rates, also cheaper labor. To offset this, city competitors had two hours' gain in deliveries. On top of this, a new executive found that the horse drivers were in the habit of coming so late and the laborers of loading the vehicles so leisurely that the wagons seldom left the yard before 10 in the morning, thus adding two hours to the natural disadvantage. This explained why the salesmen had complained they could not close orders owing to late deliveries.

A city factory and storage building was obtained, also a fleet of swift commercial vehicles, which were planned to start from the suburban plant at an early hour. The result is this business is now the biggest in its line and paying large dividends.

On the preceding page and also on this are shown a number of pictures taken by the writer recently to show the drawbacks under which crowded streets and many slow-loading vehicles standing in the street cause the motor truck to operate. To explain these in detail it becomes necessary to sketch briefly traffic conditions in New York City, where the pictures were taken.

The metropolis is a long, narrow island, the lower end of which includes a large number of exceedingly narrow and crooked streets. Uptown business traffic can not use Broadway or Fifth avenue to any extent, hence is divided into east and west sides, the former proceeding up Avenue A and First, Second and Third avenues, while the latter must use Seventh, Eighth, Ninth, 10th and 11th avenues, Sixth being a sort of neutral street which has the additional disadvantage of an elevated and a surface road. Crosstown traffic is peculiar in that a few streets carry a large portion of the vehicles, while the majority of the others are almost deserted at all times. Thus, 14th, 23rd, 42nd, 59th, 72nd and others further uptown have as much traffic as all the intermediate streets put together. Why this is so is hard to understand, for as a matter of fact every firm sending its vehicles over these streets unnecessarily is reducing the efficiency of the same from five to 10 per cent. Similarly with reference to the uptown movement, the early morning sees a continuous stream of vehicles up Eighth, Ninth and 10th avenues, while the traffic on Seventh is proceeding down. If firms would direct their drivers to give preference to Seventh or whichever avenue was least congested, they would save a large amount of time

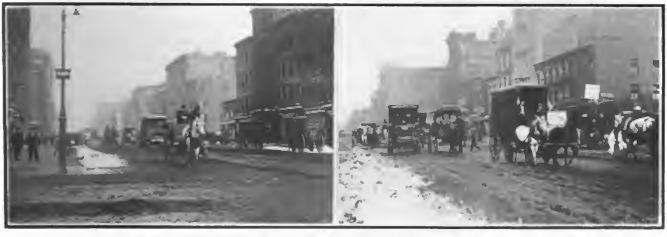


FIG. 3—WHEN THE COMMERCIAL VEHICLE IS CAUGHT IN HEAVY TRAFFIC THE DRIVER SHOULD BE INSTRUCTED TO TURN OUT AND GAIN TIME: LEFT, BLOCKED OFF; RIGHT, PASSING THE OBSTRUCTION

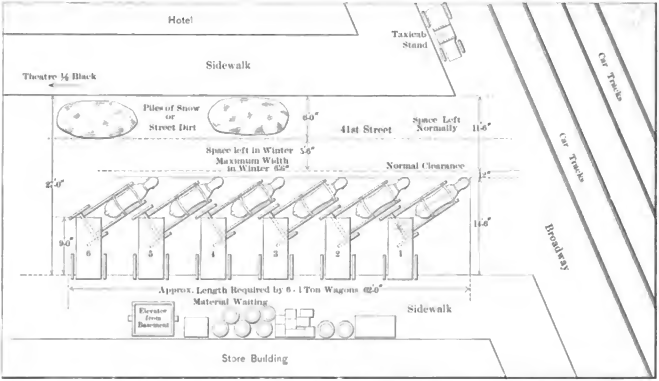


FIG. 4—LAYOUT OF A PROMINENT CROSSTOWN STREET CORNER, SHOWING PRESENT CONGESTION AND SMALL CLEARANCE SPACE LEFT FOR PASSING VEHICLES

each day, the yearly total being an appreciable amount.

In the former instance, the crosstown streets, the remedy lies in the utility of the two streets on each side of the heavily loaded ones, thus making the number three times what it is at present. But before this can be done there must be some changes made in existing con-

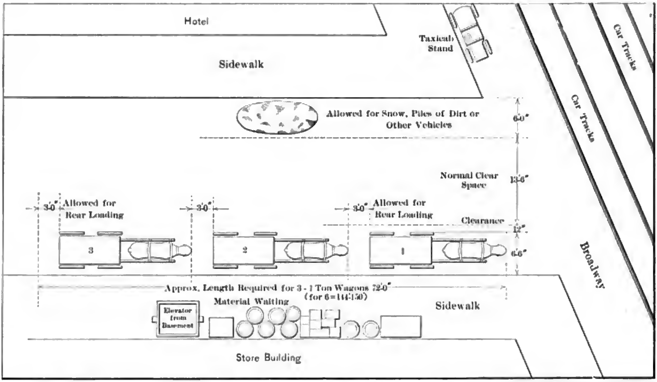


FIG. 5—ANOTHER METHOD OF LOADING APPLIED TO THE SAME SITUATION, SHOWING THE MANNER IN WHICH SIDE LOADING WOULD IMPROVE MATTERS AND WIDEN THE PASSAGE

ditions. All those which would be utilized in this scheme are now pre-empted for other purposes, 13th, 15th, 33rd, 35th, 41st, 43rd and others being occupied with needless obstructions which make present use impossible. The picture in Fig. 1 shows 33rd street, looking toward Sixth avenue, and depicts the manner in which the loading of a big department store's wagons and commercial vehicles congests the street to the point of rendering it unsuitable for other use. The same block is seen from the other end in the left portion of Fig. 2.

The actual figures are as follows: The paved portion of the street measures 30 ft.; a horse-drawn wagon of small capacity set at right angles to the curb, so as to load at the rear, the usual method, occupies no less than 15 ft. Rigs on the other side and other obstructions require seven ft., leaving for the passage under the most favorable conditions but eight ft., which is further reduced when clearance of the horses' heads is considered, as well as the fact that every one is not always set back as far as possible. On several occasions the writer has visited this street and found less than six ft. clear from one end of the block to the other. A very important point about this situation is that the block includes a fire house, as shown by the arrow. This has the following pieces of apparatus: Water tower 3, Hook and Ladder 4, and Engines 113 and 115, all big pieces, requiring plenty of room.

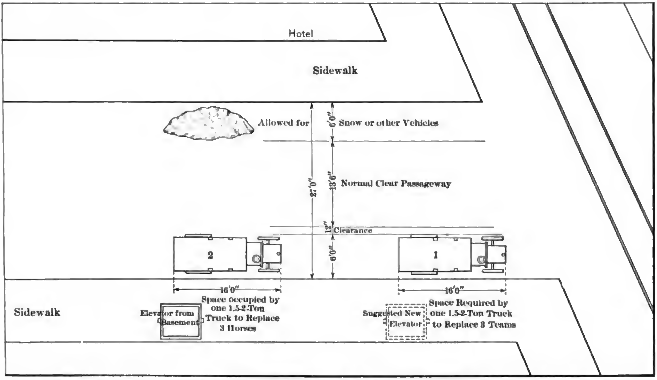


FIG. 6—THE BEST AND ULTIMATE SOLUTION OF THE PROBLEM, SHOWING SIDE-LOADING MOTOR TRUCKS OF SLIGHTLY LARGER CAPACITY, ALSO WIDTH AND CLEARNESS OF PASSAGE

The electric and gasoline delivery wagons utilized in this case effect considerable saving in space, occupying but nine ft., so that a space 14 ft. would be left, but unfortunately the horses used nullify this.

At 35th street, not shown, the situation is fully as bad or worse, the paved width being but 28 ft. Here the average vehicle used is larger and takes up more of the street, the small wagons using 12 ft. and the large ones 14, both with the horses turned to the side. As the other side is equally used, while much snow and street dirt is piled along that side, the clear channel is not alone reduced to less than six ft. six in., but the dirt piles and moving horses make the lane so small that an ordinary vehicle can not pass through. Moreover, no driver looking along this block from either end would attempt it.

The writer timed a large motor truck during the recent snowfall through this block, and the combination of vehicles going both ways, composed of all kinds of one-, two- and three-horsed wagons, motor trucks, electric delivery wagons and taxicabs, reduced the running time to one min. 25 secs. for 25 yards in the case of a small delivery car and two mins. 40 secs. for the same distance and a large, heavy truck. In miles an hour these figures are .6 and .3, respectively, or 1.64 hours and 3.17 hours for one mile. Such figures as these require no comment. If a single vehicle loses from 10 to 20 minutes passing through this one block once, what would be the loss should the day's work require that each of a large fleet passed through it a number of times?

At 43rd and 45th streets the situation is the same, the second portion of Fig. 2 showing a scene there just off the corner of Broadway, while the sketch, Fig. 4, shows an accurately laid-out plan of the conditions. In this instance, the firm not alone monopolized the sidewalk as a storage for materials, but also takes up most of the street. The drawing gives a fair idea of the

Traffic Observations of Commercial Vehicles

Item.	Vehicle. Remarks on Conditions.	1 Mile.	M.P.H.	Rated Speed
	Timed Traffic, Dec. 4, on Eighth Avenue.			
A.	Two-horse wagon. Clear track, but snow on ground	11.7	5.13	....
B.	Two-horse wagon. Lighter load, same conditions	10.8	5.55	....
C.	Four-horse wagon. Same road conditions, but very heavy load	20.7	2.90	....
D.	Four-horse wagon. Same, exceedingly heavy and bulky sugar bbls.	20.1	3.00	....
E.	One-ton D. W. (Rapid). Partly loaded, some obstructions	12.5	4.80	20
F.	One-ton D. W. (electric). Almost empty, but badly blocked by traffic	18.8	3.19	10
G.	Three-ton mail wagon (G. V. Electric). Partly loaded, only partially obstructed although slipping.	11.7	5.13	8
	Same Day, Ninth Avenue, Shorter Course.			
H.	Trolley. Behind two-horsed wagons over whole distance	16.8	3.57	....
I.	Two-horse wagon. Empty and with clear street	13.6	4.41	....
J.	Two-horse wagon. Loaded with wood, running in car tracks and blocked by other wagons	20.5	2.90	....
	Dec. 5 at 10 A. M., Snow Melting, Eighth Avenue.			
K.	3.5-Ton truck (Commer) in brewery service. Loaded, not much obstruction, but pavement wet and slippery	12.6	4.76	12
L.	3.5-Ton electric truck (G. V.). Heavily loaded with milk, streets same as above, badly obstructed by trolley, several horse trucks and rag pickers' wagons	18.5	3.24	7
M.	3.5-Ton truck (Alco). Loaded with whisky barrels, streets same, in bad block, eight teams, trolley and crosstown traffic	23.5	2.55	12
N.	Taxicab back of the above. Blocked for entire distance	23.5	2.55	30
O.	3.5-Ton electric truck (G. V.). Heavily loaded, in bad mixup, behind barrel wagon piled high with empties and trolley car which stopped at crossing	19.9	3.00	7
	Barrel wagon turned out, then truck turned out to one side and made more speed	12.6	4.76	
P.	Three-ton truck (Packard). Towing another, empty, clear street	6.1	9.84	12
Q.	Four-horse wagon. With enormous load piled high, wide and on tailboard, about equal to 3.5-ton truck, no obstructions	18.9	3.19	....
	Same Day, Noon and P. M. Observations			
R.	Fifth avenue bus. Stopped twice, once by parallel traffic ahead of it, the other by crosstown cars	33.3	1.80	12
	Same vehicle. Stopped to let off passengers only	21.0	2.86	....
	Another. In lighter traffic, no stops but pause	10.5	5.71	....
	Same. Same conditions, one stop to discharge passengers	18.2	3.30	....
	Another. Same conditions, but climbing grade, one stop	18.2	3.30	....
	Same. Without a stop, clear street	15.4	3.90	....
	Same. Same, no stop	11.9	5.04	....
	Same. Single quick stop	13.7	4.39	....
	Same. Several blocks clear, attained high speed	5.91	10.05	....
	Same. Another block at high speed	5.6	10.70	....
	Same. Ran into very bad crosstown blockade	43.7	1.37	....

passageway left, this being but five ft. six in. to six ft. wide normally. In the sketch following that, namely, Fig. 5, a suggestion is given for improving this situation by the substitution of side-loading bodies, which would allow of placing the vehicle parallel to the curb and thus increase the alleyway through the middle of the street to about 13 ft. six in.

This change, however, might not save anything in extent of loading, since the same number of vehicles would be required to handle an equal amount of goods, unless the loading time were cut materially. If the same number of wagons were required the distance along the street, 144-150 ft., would become prohibitive. A second and better alternative would be the substitution of motor trucks of slightly larger capacity, the difference in speed offsetting this. The suggestion includes the use of two 1.5 to two-ton in place of each three one-horse wagons previously used. Over the second method no gain is made in width, but as for length this is much improved, and some space left for maneuvering should that become necessary. Side-loading bodies are suggested as more efficient and quicker, while a second elevator near Broadway is also thought wise.

There is considerable food for reflection in these three sketches and the questions which they immediately bring up in matters of loading and unloading of material. Insofar as crosstown delivery service in New York City is concerned the only method for improving this lies in segregation of motors in certain streets where all may run at high rates and in clearing up the cross streets each side of the main highways so as to render them usable.

With reference to uptown movements this is not a difficult problem, either, but before any progress can be made the swifter motor-driven vehicles must be given a chance by isolating the horses on one street and the motors on another. By referring to the accompanying tables the truth of this will be seen at a glance. The observations were made by the writer using an accurate stop watch on a variety of principal thoroughfares and under widely varying conditions of weather and traffic.

The conclusions to be drawn from these figures are that but one-third to one-fourth of the delivery wagons or motor trucks' normal speed may be obtained in light traffic and this on down to less than one-tenth in heavy. As the figures show a large loss in miles an hour, this may be converted readily into total loss for the day. Thus, take the 3.5-ton trucks, in these the obstruction amounts to from five to seven miles an hour, which for a working day of eight hours would be from 40 to 56 miles. In a year this totals from 12,000 to 16,800 miles lost. In time this ranges from nearly 2.5 hours to 3.3 hours. In a season these figures would total 750 to 990 hours, or 93 to 123 full days.

One point which can be pointed out as an immediate remedy is instructing the driver to turn out and run by obstructing traffic rather than wait idly behind it. It is even a question if economic efficiency would not legitimatize turning onto the wrong side in cases of this sort, when there was no traffic there so that there was no danger. Fig. 3 is intended to bring out this point, which may be noted in the table at examples O and R, in the former 50 per cent. being gained by turning out.

Large Time and Money Saving on Farm

One Big Truck Installation in Which the Power Propelled Vehicle Has Taken Up the Routine Work of 1100 Acres With Great Economy

NEAR Geneva, N. Y., practical use of a five-ton commercial car is being made on the adjacent farms of Mrs. George H. Lewis and Alfred G. Lewis. The truck is a Pierce-Arrow with worm drive and has been in service just a year. The land comprises Bellwood Farms, the property of Mrs. Lewis, of 350 acres, and White Springs owned by Mr. Lewis, 700 acres, making a total area of 1050. Both are devoted to sheep, dairy cattle and small market truck, the truck being owned jointly but with an accurate ledger account of the tonnage and expense.

The purchase of the truck came in the following manner: In the spring of 1911, 80 acres were planted in peas for the canning factory at Geneva. The viners, or shellers, were located at the farm. At the time of harvest it took all the farm teams to haul the vines to the shellers, and the problem of getting the shelled peas, which are put into 60-pound baskets, to the factory in the least possible time was solved by the use of the 66-horsepower Pierce-Arrow touring car owned by Mr. Lewis. The body was removed and a rack holding 52 baskets was built on the chassis. The harvest lasted for 15 days. Shelled green peas must get to the factory without delay, but the touring car solved the problem and they reached the factory in the best possible condition. An accurate account of the cost of transporting them demonstrated that a heavy truck for farm work would be a paying investment and a great time saver.

The five-ton Pierce-Arrow worm drive truck was delivered on Sept. 1, 1911, and the following classes of freight handled by the truck have demonstrated clearly its practicability and the reduced cost of transportation: Lumber, cement, sand and gravel, brick, cherries, apples, wheat, straw, hay and feed of all kinds, manure to the different fields, cabbage, potatoes cord wood sheep and cattle to market, coal, bailed shavings, milk to down town dairy, etc. The modern farm has a large class of freight to handle and this truck certainly is adapted for a wide range of usage. It also has been used for filling silos and cutting corn stalks as well as hauling harrows on plowed ground. Upon occasions, it has been used for plowing.

From Sept. 1 to date the truck has run 1538 miles, using 376 gallons of gasoline and hauling 1,316,620 pounds of freight. It will be seen from this that four miles is the average distance on a gallon of gasoline. The fuel expense at 12 cents a gallon equals $45.12. The following gives the total cost of operation for the above freight handled from Sept. 1 to Dec. 1, 1911:

Mileage	1538
Gallons gasoline, 376 at 12 cents	$ 45.12
Driver and time of men handling freight	225.00
Insurance on truck	24.00
Depreciation at 5 per cent	40.00
Oil and grease	6.00
Interest on investment at 6 per cent	48.00
	$388.12

This cost has been reduced materially, as a new man who had never driven a motor vehicle was taught to operate it, and a good deal of time wasted, as the truck was not loaded to capacity until he became competent.

The car was put in operation practically at the end of the farm season. From April until September is the busiest time in farming. The truck permits keeping the horses at their proper labor and replaces three teams.

VIEWS ON THE LEWIS FARMS, NEAR GENEVA, SHOWING THE PIERCE-ARROW TRUCK AT WORK UNDER SEVERAL DIFFERENT CONDITIONS. NOTE THE BIG LOAD OF CABBAGES

Economies Effected in Grocery Service

A Springfield, Mass., Wholesale Grocer Saves $5,000 a Year with Great Extension of Territory by Using Three Three-Ton Packard Trucks

IT WILL be admitted without question that the handling of fruit and produce is a business in which the matter of quick transportation is of serious moment. The margin of profit is insufficient to warrant taking large risks, yet the very nature of the demand for this line is such that both the wholesaler and retailer are forced to take chances. Hence, any method of distribution which will eliminate delays is of prime importance.

The Henry J. Perkins Company, Springfield, Mass., serves a wide area. Its wholesale fruit and produce depot is so located as to permit of ready shipment by steam railroad, and the freight rates are by no means excessive. Northampton, some 20 miles to the north, represents one of the average long hauls, and the railroad charge for this distance is 12 cents a 100 pounds on this class of goods. Other cities and towns served most frequently are Holyoke, Westfield, Chicopee, Chicopee Falls, Indian Orchard and Palmer. All are within the 20-mile radius.

The Perkins concern has been established for some years, and now employs 12 horses and three Packard three-ton trucks. One of the latter was placed in service in March, 1910; the second in June of that year, and the third in June, 1911. The figures presented herewith have to do with the first truck purchased, concerning which an accurate account of the expenses was kept.

When the trucks were secured, it was the intention of the company to replace some of its horsed wagons, but the business has been increased so materially that it has been impossible to put this plan into operation. The horses are utilized almost entirely for delivering goods within the city of Springfield, while the automobiles make daily trips to the towns and cities mentioned.

Massachusetts is noted for its good roads, but it must be admitted in this connection that the ways over some of these routes have not been improved to the same extent as applies along the so-called through lines of travel, so that it may be said that the roads over which these trucks are called upon to operate are at best only fair. Still, the vehicles have no trouble in covering between 40 and 60 miles daily, this depending on the number of trips necessary to supply the customers.

Mention has been made of the freight rates to Northampton, as an instance of those which apply in this territory. The Perkins company makes a charge of 15 cents a 100 pounds for delivery in that city, and the retailers are more than glad to pay the additional three cents, for obvious reasons. In the first place, they secure their goods when wanted; a telephone order sent to the Springfield office in the morning being filled on the first afternoon trip of the truck, at the very latest.

Moreover, the goods are delivered at the door, obviating the necessity for maintaining a team with which to convey the shipment from the railroad freight house, or the necessity for hiring this work done by others. It readily may be seen, that the additional three cents is saved in more ways than one.

The chief problem in connection with maintaining the trucks from the first was that of tires. When purchased the initial Packard vehicle was fitted with four-inch Hartford twin tires, but it was soon found that these were unsatisfactory. Mr. Perkins decided that this was

THE OLDEST OF THE PACKARD VEHICLES OWNED BY THE PERKINS COMPANY, SHOWN FULLY LOADED a matter that must have instant attention and went to the plant of the Hartford Rubber Works Company, Hartford, Conn., where he consulted with experts on motor truck equipment. As a result the four-inch members were replaced with five-inch twins, since which time there has been no trouble whatever.

Respecting this phase of commercial car operation, Mr. Perkins gives as his opinion that a motor truck user should take up the matter of tires with the tire manufacturer at the same time he gives his order for the vehicle. He holds that conditions under which the car must be operated vary so materially, that it is utterly impossible for the maker of the chassis to meet the requirements. Inasmuch as the tire manufacturer is even more concerned in the satisfactory operation of his product, Mr. Perkins believes that very few will hesitate to take all the time required in order to solve the problem.

While it developed that the original tires fitted to the first Packard purchase were not giving satisfactory service within a few weeks after the car was put into commission, it is pointed out that the size recommended by the Hartford expert have proven even more productive of mileage than was expected. The front wheel equipment lasted considerably over a year, and when it is remembered that the truck has covered between 40 and 60 miles daily, this means a total mileage of at least 12,500, and probably nearer 15,000.

ONE OF THE PERKINS TWO-HORSE TEAMS, SHOWING THE HIGH GRADE OF ANIMALS USED

In the matter of expense, it has been stated that an accurate account of the expenditures on this car was kept during the first year. The total gasoline consumed cost $317.02, while the oil figure was $46.77. In view of the experience gained with reference to tires, Mr. Perkins feels it is safe to estimate these at 3 cents a mile. It will be noted that the extreme limit of 60 miles a day is figured in the accompanying table. He believes the truck is good for five years at least, but writes off depreciation at 25 per cent, the same as on his horses.

One other thing, concerning which Mr. Perkins has a decided opinion, is that of driver. He pays the horse drivers $13 a week, and while he is aware that many concerns consider that a motor truck operator is worth no more to them than the man who handles the horses, he holds that a cheap man may do more harm to the vehicle through inattention than one who is made to feel that it is worth more money to possess the necessary skill to operate and care for an automobile in a proper manner. Accordingly, the Perkins' operators are paid $3 a day, or $18 a week. This additional $5 a week is an important incentive, and one which has proved decidedly satisfactory in practice. In addition a helper is employed on the truck at a wage of $2 a day, or $12 a week.

Of course, each horse wagon is drawn by two animals, for which the Perkins company pays $400 each. The wagons cost $500 and the harnesses $60. Mr. Perkins says one of the trucks will do the work of six horses, although it may be questioned whether or not it would be possible to cover 40 to 60 miles daily with six horses. However, basing the figures on this estimate the cost of the two equipments may be compared as follows:

PACKARD TRUCK, ONE YEAR

Gasoline	$317.02
Oil	46.77
Tires, 3 cents a mile	561.60
Garage, $7.50 a month	90.00
Driver, $18 a week	936.00
Helper, $12 a week	624.00
Depreciation, 25% on $3,725	931.25
Interest, 6% on $3,725	223.50
Total	$3,730.14

SIX-HORSE EQUIPMENT, ONE YEAR

Board, 70 cents a day, each	$1,533.00
Rent	210.00
Shoeing	180.00
Veterinary	24.00
Drivers, $13 a week	2,028.00
Depreciation, horses, 25% on $2,400	600.00
Depreciation, wagons, 25% on $1,500	375.00
Depreciation, harnesses, 25% on $180	45.00
Interest, 6% on $4,080	244.80
Total	$5,239.80
Balance in favor of the truck	$1,509.66

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WINTER PREPAREDNESS

The recent sudden fall of five inches of snow in New York City, this being combined with a sharp drop in temperature and a cold, high wind, brought out with considerable force the fact that few if any of the owners of large fleets of commercial cars in the Metropolis are prepared or have men in their employ who prepare, for such changes. To get the best results from a big group of commercial cars, the owners or men in charge always should be ready for some such instantaneous shift as from clear streets to several inches of snow and ice, or from 40 down to 10 degrees of temperature.

The most apparent manner in which the change referred to affected the service lay in the use of a form of non-skids for the wheels. It may be a fact, as many large car owners complain, that there is no really efficient and long-lived device of this sort on the market, but this does not excuse going without those which are available. What impelled these remarks was the sight of perhaps 90 per cent. of New York's large number of commercial vehicles out on that day with absolutely no change in their equipment, despite the tremendous alteration which had come in the weather, bringing with it a decided difference in traffic conditions.

The writer spent that morning on the streets and everywhere the drivers had done as well as they could, but the equipment in almost every case was of the home-made nature; clothes rope and ship's hawsers, small chains and enormous ones, pieces of cloth tires on, various iron forms wired on, and others were some of the incongruous things with which the men were attempting to cope with the sudden alteration in conditions. It must be said, also, that they had little success. After watching one driver spend 25 minutes in rounding a slippery corner, and making progress of perhaps 20 yards in so doing (at the rate of .02 miles an hour for a car capable of doing 16), the writer formed a low opinion of the firm which will spend $5000 for a truck and then keep it working at a minimum efficiency for want of perhaps $10 worth of tire grips or a substitute therefor. Every car out of the garage on such a day ought to have some form of non-skid and non-slip device, even if it is nothing but proper sized rope, carefully wound on and fastened.

* * *

THE NEED FOR SERVICE STATIONS

The service station problem is a complicated one; it is most pressing just now when the truck industry is passing into boom times. In many purchases the buyer of commercial vehicles does not know what to do with his cars in so far as housing, repairing and cleaning them is concerned. He does not want to keep them in a corner of the stable, a wise decision; he does not feel sufficiently certain of their success to go to the expense of a separate structure, while in addition, the latter course would necessitate the hiring of many extra men. Besides calling for the employment of these, the installation may be so small as not to provide sufficient work for them at all times, in which it would show a loss from the start.

These and many other problems deter a number of owners of 10 or more horse teams from making the change. If the right kind of service station were started in the same city by the manufacturers of a car suitable for their use, they would not hesitate long before falling into line. In this connection the matter of proper systems for handling service stations and garages is giving the owners of such places and parties considering the proposition much thought. In the present issue there is presented the second of a series of articles on this subject which it is hoped will be of great interest in this connection.

* * *

MAIL DELIVERY SHOWS PROGRESS

The two recent actions of the postoffice department officials, if they may be taken as straws which show the direction of the wind, indicate that this branch of the government is convinced at last of the desirability and economy of motor collection and delivery of mail. While one of the higher officials was conducting a city-to-city test of the rural free delivery form, including the transportation of a large quantity of newspapers for the entire distance, another was experimenting with the hauling of mailmen and their bags full of mail to the points where house-to-house delivery commenced. The former test dealt with collections and delivery, the latter only with the expedition of deliveries. As collections have been made by machine in the case of a number of large cities, notably New York, Indianapolis and Detroit, for some time past, these small items may be taken as indicative of an awakening in Mr. Hitchcock's department, which holds out large promise to manufacturers if continued to its logical conclusion.

Late News of the Month—Mostly Shows

Notes of Big Chicago National Display with Long List of Exhibitors—Brief Mention of Local Exhibitions—Electric Vehicle Happenings in and Around Boston and New York—Business Troubles

WHEN the Chicago commercial week opens in the Coliseum and First Regiment buildings in that city Feb. 3 the devotees of this branch of the industry will have an opportunity to feast their eyes upon the greatest collection of different makes, types and sizes ever brought together in the world. These will fill to overflowing the two buildings, the regimental structure being utilized for the first time. Last year a most excellent and unusually complete display filled the Coliseum, it being thought at first that even this building was somewhat large for the purpose. Events proved the opposite, every nook and cranny being occupied when the doors opened with a few belated demands which could not be filled.

Taking stock of the manufacturers sufficiently early this year, and allowing for the enormous increase in this business which the past twelvemonth has brought forth, the management wisely decided to try to fill both buildings. According to the list of exhibitors presented herewith they have been unusually successful in this respect, and the opening night will not see a single vacant spot, unless this be brought about by delay in removing the pleasure cars which fill the hall during the preceding week, Jan. 27 to Feb. 2.

In respect to the support of accessory makers some slight apprehension was felt, for at last year's Madison Square Garden display in New York, as well as in the Windy City, the second period was an unusually dull one for these and they united in stating that it was decidedly unprofitable. As the list shows, however, they have taken heart at the great commercial car awakening of the season, and will be there in force, the names below representing the cream of the industry and that, too, without a notable exception or omission.

In the lists the accessory manufacturers showing during the first week are given as well as those who displace them during the second period in the cases where a change is made. The exhibitors:

MAIN FLOOR, COLISEUM—POWER VEHICLES

A-1 Thomas B. Jeffery Co., Kenosha, Wis.
A-2 Baker Motor Vehicle Co., Cleveland, Ohio.
A-3 White Co., Cleveland, Ohio.
A-4 Mack Bros., Motor Car Co., Allentown, Pa.
B-1 Rapid Motor Vehicle Co., Pontiac, Mich.
B-2 Reo Motor Car Co., Lansing, Mich.
B-3 Kelly Motor Truck Co., Springfield, Ohio.
B-4 Grabowsky Power Wagon Co., Detroit, Mich.
B-5 Pope Mfg. Co., Hartford, Conn.
C-1 Packard Motor Car Co., Detroit, Mich.
C-2 Avery Co., Peoria, Ill.
C-3 F. B. Stearns Co., Cleveland, Ohio.
C-4 Locomobile Co. of America, Bridgeport, Conn.
C-5 Cartercar Co., Pontiac, Mich.
C-6 Waverley Co., Indianapolis, Ind.
D-1 Garfoe Co., Elyria, Ohio.
D-2 Peerless Motor Car Co., Cleveland, Ohio.
D-3 Metzger Motor Car Co., Detroit, Mich.
D-4 Brush Runabout Co., Detroit, Mich.
D-5 Knox Automobile Co., Springfield, Mass.
D-6 Gramm Motor Car Co., Lima, Ohio.
E-1 American Locomotive Co., 1886 Broadway, New York.
E-2 Anderson Electric Car Co., Detroit, Mich.
E-3 Schmidt Bros. Co., Chicago, Ill.
F-1 Kissel Motor Car Co., Hartford, Wis.
F-2 Pierce-Arrow Motor Car Co., Buffalo, N. Y.
G Reliance Motor Truck Co., Owosso, Mich.
H General Motors Co., Detroit, Mich.
J Staver Carriage Co., Chicago, Ill.
K Lozier Motor Co., Detroit, Mich.
L W. H. McIntyre Co., Auburn, Ind.
M-1 Morgan Motor Truck Co., Worcester, Mass.
M-2 Clark Delivery Car Co., Grand Crossing, Chicago.
N-1 Harder Fireproof Storage & Van Co., Chicago.
N-2 Federal Motor Truck Co., Detroit, Mich.
N-3 Adams Bros. Co., Findlay, Ohio.

COLISEUM ANNEX—MAIN FLOOR—POWER VEHICLES

O Eclipse Truck Co., Franklin, Pa.
P-1 Alden-Sampson Mfg. Co., Detroit, Mich.
P-2 Atterbury Motor Car Co., Buffalo, N. Y.
Q-1 Durant-Dort Carriage Co., Flint, Mich.
Q-2 U. S. Motor Truck Co., Cincinnati, Ohio.
Q-3 Dayton Auto Truck Co., Dayton, Ohio.
Q-4 Dorris Motor Car Co., St. Louis, Mo.
R Mais Motor Truck Co., Indianapolis, Ind.
S General Vehicle Co., Long Island City, N. Y.

FIRST REGIMENT ARMORY—MAIN FLOOR—POWER VEHICLES

A-1 Wyckoff, Church & Partridge, Inc., New York.
A-2 Walker Vehicle Co., Chicago, Ill.
A-3 Wyckoff, Church & Partridge, Inc., New York.
A-4 Stegeman Motor Car Co., Milwaukee, Wis.
B-1 Four-Wheel Drive Auto Co., Clintonville, Wis.
B-2 Sanford-Herbert Co., Syracuse, N. Y.
B-3 Chicago Commercial Car Co., Chicago, Ill.
B-4 Lauth-Juergens Motor Car Co., Fremont, Ohio.
B-5 Packers Motor Truck Co., Wheeling, W. Va.
B-6 A. O. Smith Co., Milwaukee, Wis.
C-1 Sternberg Mfg. Co., Milwaukee, Wis.
C-2 Henry Lee Power Co., Chicago, Ill.
C-3 Motor Wagon Co., of Detroit, Detroit, Mich.
C-4 Buick Motor Co., Flint, Mich.
D-1 National Motor Truck Co., Bay City, Mich.
D-2 Universal Motor Truck Co., Detroit, Mich.
D-3 Harwood-Barley Mfg. Co., Marion, Ind.
D-4 Mercury Mfg. Co., Chicago, Ill.
D-5 H. E. Wilcox Motor Car Co., Minneapolis, Minn.
E-1 Speedwell Motor Car Co., Dayton, Ohio.
E-2 Velie Motor Vehicle Co., Moline, Ill.
E-3 Poss Motor Co., Detroit, Mich.
F-1 Schacht Motor Car Co., Cincinnati, Ohio.

F-2 Commerce Motor Car Co., Detroit, Mich.
G-2 Service Motor Car Co., Wabash, Ind.
G-3 Monitor Auto Works.

COLISEUM GALLERY—ACCESSORIES

1 Hayes Mfg. Co., Detroit, Mich.
2-3 Motz Clincher Tire & Rubber Co., Akron, Ohio.
4 C. T. Ham Mfg. Co., Rochester, N. Y.
5-5a Kinsey Mfg. Co., Toledo, Ohio.
5b Standard Roller Bearing Co., Philadelphia, Pa.
6 Atwater-Kent Mfg. Works, Philadelphia, Pa.
7 Imperial Brass Mfg. Co., Chicago, Ill.
8-9 Michelin Tire Co., Milltown, N. J.
10 Driggs-Seabury Ordnance Corp., Sharon, Pa.
11 Warner Gear Co., Muncie, Ind.
12-13 Pennsylvania Rubber Co., Jeannette, Pa.
14 Remy Electric Co., Anderson, Ind.
15 Swinehart Tire & Rubber Co., Akron, Ohio.
16 Connecticut Telephone & Elec. Co., Meriden, Conn.
17 Wheeler & Schebler, Indianapolis, Ind.
18-19 Diamond Rubber Co., Akron, Ohio.
20 N. Y. & N. J. Lubricant Co., 165 Broadway, New York.
21 Jones Speedometer Co., 76th and Broadway, New York.
22 Weed Chain Tire Grip Co., 28 Moore street, New York.
23 Whitney Mfg. Co., Hartford, Conn.
24 Briscoe Mfg. Co., Detroit, Mich.
25 R. E. Hardy Co., Chicago, Ill.
26-27 Ajax-Grieb Rubber Co., 57th and Broadway, New York.
28 Standard Welding Co., Cleveland, Ohio.
29 American Ball Bearing Co., Cleveland, Ohio.
30-31 Republic Rubber Co., Youngstown, Ohio.
32 Timken-Detroit Axle Co., Detroit, Mich.
33 Timken Roller Bearing Co., Canton, Ohio.
34-35 Consolidated Rubber Tire Co., 20 Vesey street, New York.
36 McCord Mfg. Co., Detroit, Mich.
37 A. R. Mosler & Co., 103 West 29th street, New York.
38-39 Fisk Rubber Co., Chicopee Falls, Mass.
40 National Carbon Co., Cleveland, Ohio.
41 Badger Brass Mfg. Co., Kenosha, Wis.
42 Veeder Mfg. Co., Hartford, Conn.
43 Hartford Rubber Works Co., Hartford, Conn.
44 Continental Caoutchouc Co., 1790 Broadway, New York.
45 G. & J. Tire Co., 1790 Broadway, N. Y.
Morgan & Wright, 1790 Broadway, New York.
46 Gray & Davis, Amesbury, Mass.
47-48 B. F. Goodrich Co., Akron, Ohio.
49 C. F. Splitdorf, 265 Walton avenue, New York.
50 National Tube Co., Pittsburgh, Pa.
51-52 Goodyear Tire & Rubber Co., Akron, Ohio.
53 Herz & Co., 187 Elm street, New York.
54 Diamond Chain & Mfg. Co., Indianapolis, Ind.
55 Wm. Cramp & Sons Ship & Engine Bldg. Co., Philadelphia, Pa.
56 Vesta Accumulator Co., Chicago, Ill.
57 J. H. Williams Co., Brooklyn, N. Y.
58 A. W. Harris Oil Co., Providence, R. I.
59-60 Hartford Suspension Co., Jersey City, N. J.
61 Baldwin Chain & Mfg. Co., Worcester, Mass.
62 Continental Motor Mfg. Co., Muskegon, Mich.
63 Spicer Mfg. Co., Plainfield, N. J.
64 Pittsfield Spark Coil Co., Dalton, Mass.
65 Brown-Lipe Gear Co., Syracuse, N. Y.
66 Weston-Mott Co., Flint, Mich.
67-68 Firestone Tire & Rubber Co., Akron, Ohio.
69a Royal Equipment Co., Bridgeport, Conn.
69b Electric Storage Battery Co., Philadelphia, Pa.
70 Oliver Mfg. Co., Chicago, Ill.
71-72 S. F. Bowser & Co., Fort Wayne, Ind.
73 Edmunds & Jones Mfg. Co., Detroit, Mich.
74 Kokomo Electric Co., Kokomo, Ind.
75 Byrne, Kingston & Co., Kokomo, Ind.
76a U. S. Light & Heating Co., 30 Church street, New York City.
76 Stromberg Motor Devices Co., Chicago, Ill.

COLISEUM ANNEX—SECOND FLOOR—ACCESSORIES

77 Isaac G. Johnson & Co., Spuyten Duyvil, New York City.
78 Dean Electric Co., Elyria, Ohio.
79 Gabriel Horn Mfg. Co., Cleveland, Ohio.
80 A. O. Smith Co., Milwaukee, Wis.
81 Voorhees Rubber Co., Jersey City, N. J.
82 Auto Parts Mfg. Co., Muncie, Ind.
83 Eisemann Magneto Co, New York City.
84 W. H. Leland & Co., Worcester, Mass.
85 Muncie Gear Works, Muncie, Ind.
86 Leather Tire Goods Co., Niagara Falls, N. Y.
87 American Circular Loom Co., Boston, Mass.
88 Covert Motor Vehicle Co., Lockport, N. Y.
89 Link-Belt Co., Indianapolis, Ind.
90 Gemmer Mfg. Co., Detroit, Mich.
91 Havoline Oil Co., New York City.
92 Champion Ignition Co., Flint, Mich.
93 Detroit Electric Appliance Co., Detroit, Mich.
94 Auburn Auto Pump Co., Boston, Mass.
95 Heinze Electric Co., Lowell, Mass.
96 Booth Demountable Rim Co., Cleveland, Ohio.
97 Lovell-McConnell Mfg. Co., Newark, N. J.
98 Apple Electric Co., Dayton, O.
99 Bosch Magneto Co., New York City.
100 Sparks-Withington Co., Jackson, Mich.
101 Lee Tire & Rubber Co., Conshohocken, Pa.
102 Warner Mfg. Co., Toledo, Ohio.
103 Turner Brass Works, Sycamore, Ill.
104 National Coil Co., Lansing, Mich.
105 Ross Gear & Took Co., Lafayette, Ind.
106 Edison Storage Battery Co., West Orange, N. J.
107 Federal Rubber Co., Cudahy, Wis.
108 Stewart & Clark Mfg. Co., Chicago, Ill.
109 Empire Tire Co., Trenton, N. J.
110 Buda Co., Harvey, Ill.
111 Stutz Auto Parts Co., Indianapolis, Ind.
112 United Rim Co., Akron, Ohio.
113 Briggs & Stratton Co., Milwaukee, Wis.
114 George A. Haws, New York City.
115 General Electric Co., Schenectady, N. Y.
116 Jacobson & Brandlow, Pittsfield, Mass.
117 Dorian Remountable Rim Co., New York City.
118 Waukesha Motor Co., Waukesha, Wis.
119 International Acheson Graphite Co., Niagara Falls, N. Y.
120 Esterline Co., Lafayette, Ind.
121 Falls Machine Co., Sheboygan Falls, Wis.
122 Simms Magneto, New York City.
123 Western Motor Co., Marion, Ind.
124 Warner Instrument Co., Beloit, Wis.
125 Valentine & Co., New York City.
126 Batavia Rubber Co., Batavia, N. Y.
127 Gray-Hawley Mfg. Co., Detroit, Mich.
128 Avery Portable Lighting Co., Milwaukee, Wis.
129 J. H. Sager Co., Rochester, N. Y.
130 Jos. Dixon Crucible Co., Jersey City, N. J.
131 Globe Machine & Stamping Co., Cleveland, Ohio.
132 Adam Cook's Sons, New York City.
133 Hoffecker Co., Boston, Mass.
134 C. Cowles & Co., New Haven, Conn.
135 Columbia Lubricants Co., New York City.
136 C. A. Shaler Co., Waupun, Wis.
137 Pantasote Co., New York City.
138 Sprague Umbrella Co., Norwalk, Conn.
139 Continental Rubber Works, Erie, Pa.

140. Start-Lite Co., Chicago, Ill.
141 Universal Tire Protector Co., Angola, Ind.
142 Auto Supply Mfg. Co., Brooklyn, N. Y.
143 Double Fabric Tire Co., Auburn, Ind.
144 Hess Spring & Axle Co., Carthage, Ohio.
145 Doehler Die Casting, Brooklyn, N. Y.
146 G. Piel Co., Long Island City, N. Y.
147 Universal Wind Shield Co., Chicago, Ill.
148 Wolverine Lubricating Co., New York City.
149 Allen Auto Specialty Co., New York City.
150 Willard Storage Battery Co., Cleveland, Ohio.
151 Kellogg Mfg. Co., Rochester, N. Y.
152 Western Tool & Forge Co., Brackenridge, Pa.
153 Dover Stamping & Mfg. Co., Cambridge, Mass.
154 Stein Double Cushion Tire Co., Akron, O.

FIRST REGIMENT ARMORY GALLERY—ACCESSORIES

1 The Horseless Age, 250 West Fifty-fourth street, New York.
2 Atlas Chain Co., Brooklyn, N. Y.
3 C. O. Tingley & Co., Rahway, N. J.
4 Barco Brass & Joint Co., Chicago, Ill.
5 Detroit Lubricator Co., Detroit, Mich.
6 Perfection Spring Co., Cleveland, Ohio.
7 U. S. Ball Bearing Mfg. Co., Oak Park, Ill.
8 The Lefever Arms Co., Syracuse, N. Y.
9 The Eagle Co., Newark, N. J.
10 The Mayo Mfg. Co., Chicago, Ill.
11 C. M. B. Wrench Co., Syracuse, N. Y.
12 Motor Vehicle Publishing Co., New York City.
13 Rhineland Machine Works Co., New York City.
14 Automatic Motor & Engineering Co., Chicago, Ill.
15 International Metal Polish Co., Indianapolis, Ind.
16 National Motor Supply Co., Cleveland, Ohio.
17 Wisconsin Motor Mfg. Co., Milwaukee, Wis.
18 S. Hoffnung & Co., New York City.
19 Findeisen & Kropf Mfg. Co., Chicago, Ill.
20 The Brown Co., Syracuse, N. Y.
21a Selbach Rubber Co., Boston, Mass.
21b Martel Blow-Out Protector Co., Chicago, Ill.
22 Sheldon Axle Co., Wilkes-Barre, Pa.
23 Peck Wheel Co., Chicago, Ill.
24 S. Breakstone, Chicago, Ill.
25 K-W Ignition Co., Cleveland, Ohio.
26 Perfect Window Regulator Co., New York City.
27 E. Edelmann & Co., Chicago, Ill.
28 Standard Varnish Works, Chicago, Ill.
29 Keystone Lubricating Co., Chicago, Ill.
30 Motor, New York City.
31 Frank Mossberg Co., Attleboro, Mass.
32 Norton Grinding Co., Worcester, Mass.
33 Morrison-Ricker Mfg. Co., Grinnell, Ia.
34 Chilton Co., Philadelphia, Pa.
35 The Class Journal Co., New York City (for Motor Age).
36 Longdin & Brugger Co., Fond du Lac, Wis.
37 The Troy Carriage Sun Shade Co., Troy, Ohio.
38 The Model Gas Engine Co., Peru, Ind.
39 Shawmut Tire Co., Boston, Mass.
40 Class Journal Co., New York City (for Automobile).

Accessory Changes at Chicago

COLISEUM—ACCESSORIES

1 Model Gas Engine Works, Peru, Ind.

FIRST REGIMENT ARMORY—ACCESSORIES

3-4 Marburg Bros., Ins., 1777 Broadway, New York.
9 Merchant & Evans Co., Philadelphia, Pa.
10 The Punctureless Tire Co. of Illinois, Chicago, Ill.
11 The Garage Equipment Mfg. Co., Milwaukee, Wis.
12 Torbensen Gear & Axle Co., Bloomfield, N. J.
14-15 The Aristos Co., 250 West 54th street, New York.
16 Milwaukee Oil Pump & Tank Co., Milwaukee, Wis.
20 Automobile Journal Publishing Co., Pawtucket, R. I.
21 American Bronze Co., Berwyn, Pa.
23 Power Wagon Publishing Co., Chicago, Ill.
24 Michigan Magneto Co., 117 Bagley avenue, Detroit, Mich.
25-26 Lavigne Mfg. Co., Detroit, Mich.
27 The John L. G. Dykes Co., 222 North State street, Chicago, Ill.
28 Clucker & Hixson Co., 32 Park Place, New York.
31 Van Cleef Bros., 7711 Woodlawn avenue, Chicago, Ill.
33 Chicago Steel Foundry Co., Chicago, Ill.
36 Hydraulic Oil Storage Co., Detroit, Mich.
39 Dayton Engineering Laboratories Co., Dayton, Ohio.

News of the Smaller Shows the Country Over

WHILE the bigger national events overshadow at this time and for a month or more to come the local exhibitions the latter will be an equally potent selling factor later on, for they will be a means of convincing the actual buyers scattered around the country by actual observation of the merits of the various vehicles. For this reason any information relative to them is both timely and pertinent.

Outside of Philadelphia, Baltimore, Pittsburgh and possibly Cleveland no separate time or space will be allotted the business wagons, but each and every show will have a few cars of this character and for this reason the date of the display and some mention of the management is important. Below is presented a number of notes of what might be termed the minor circut, because in many cases the manufacturer's show trucks after the national exhibitions travel from one agent to the other, and by these are exhibited at the local displays one after the other. In many cases, too, a factory representative goes with the vehicle to point out its superior merits.

PHILADELPHIA, Dec. 27.—A radical departure in the plans for the second week of the local automobile show has been announced, necessitated by reason of the large number of applications for commercial vehicle space. Originally being the intention to confine the motor truck display to the Third Regiment Armory, during the second week, Jan. 22 to 27, inclusive, the revised plans comprehend the exhibition of commercial cars at the First Regiment Armory, in addition; thus the show in the latter building, instead of being devoted exclusively to electrics, will consist of electric pleasure cars and equipment and of commercial cars.

TOLEDO, Dec. 26.—The approaching Toledo automobile display promises to eclipse anything of the kind ever undertaken here. Exhibitors are enthusiastic, and all available space will be taken by the concerns handling cars and accessories. An extensive advertising campaign throughout northwestern Ohio will be inaugurated, and indications for success are of the brightest. The Terminal building, which was selected as a location, is being prepared and beautified, and nothing will be left undone by the managers of the exhibition to attract the attention of the public generally.

DAYTON, Dec. 26.—Committees representing the Dayton Automobile Club and the automobile dealers of the city have selected Elmer C. Redelle, manager of the Dayton baseball team, to take charge of the third annual automobile show, which will be held Feb. 12-19. The club committee is composed of William Stroup, Walter Kidder, E. A. Deeds and Walter Kuhns. The dealers are represented by George L. Baker, William H. Yeazell, Earl Hosler, George W. Shroyer and G. G. Peckham. Plans for the show will be begun at once.

CLEVELAND, Dec. 26.—Automobile manufacturers and dealers and the Cleveland Automobile Club will work jointly this year toward the success of the automobile show to be held in Central Armory Feb. 17 to 24, inclusive. Frank W. Phillips resigned as chairman of the show committee recently. H. M. Adams was chosen to fill the vacancy. Fred H. Caley, secretary of the Automobile Club, was named as manager by the committee.

DETROIT, Dec. 26.—The eleventh annual automobile show, to be held in the Wayne Gardens and the new Annex, 108 feet wide by 165 feet long, promises to be without any doubt America's leading local display and the largest local exhibition in the country if not the most important. The trade of Detroit accepted readily the proposition of the D. A. D. A. to construct this building providing they would take space.

MILWAUKEE, Dec. 26.—Space for the fourth annual show, to be given by the Milwaukee Automobile Dealers' Association in the Auditorium Jan. 13 to 19, inclusive, was allotted last week and the results show that there will be 70 pleasure car exhibits, 30 of commercial cars and 51 of accessories.

SYRACUSE, Dec. 26.—The Automobile Dealers' Association is perfecting plans for the third annual automobile show in the Armory in March. An effort is being made to find a place of exhibition for trucks and accessories, because of the unusually heavy demands for space made by manufacturers of passenger cars.

BUFFALO, Dec. 27.—Space in the second automobile show of the Buffalo season will be allotted Dec. 29. The show will be held in Convention hall Feb. 5-10. The enterprise is under the management of George C. Fehrman. Space may be set aside for trucks.

THREE DAYS FOR TRUCKS AT BALTIMORE

BALTIMORE, Dec. 27.—The real big feature of the Baltimore motor car show which will be held in the Fifth Regiment Armory Feb. 20 to 28, inclusive, will be the setting aside of the last three days for the display of commercial cars, exclusively. This will be the first time in the history of any local show that the commercial feature has been of any size or importance to warrant the show management to give to it exclusive days for the display. Last year was the first time that there were any displays of any consequence and they proved a big feature of the exhibition at that time. There has been such a demand for commercial cars here within the past year, however, and there have been so many of the local representatives of these particular cars who have stated their intention of having exhibits of a larger size than ever that the management of the show believes the showing of these cars on the days mentioned will prove very popular with the business men of the city and State. The show in February will be under the supervision of the A. C. of Maryland and the Baltimore Dealers' Ass'n.

BRILLIANT PROSPECTS IN PITTSBURGH

PITTSBURGH, Dec. 27.—Both the Duquesne Garden and the Exposition shows will have a much larger exhibit of trucks and commercial vehicles this year than ever before. The Exposition show in particular under the management of Thomas I. Cochran, who managed last year's exhibition very successfully, is booking a splendid lot of entries for the Pittsburgh Automobile Association. There are more than 300 commercial vehicles in daily operation in the city and their value exceeds $750,000. For this reason truck manufacturers are looking upon Pittsburgh with more favor every month. Among those already signed for the Exposition show are the following: Commer, Saurer, Mack, Alco, Kelly, White, Velie, Atterbury, Dayton, Chase, Mais, Bessemer, Lange, Lyon, Penn 30, Rambler and Kline.

Electric Vehicle Association's Interesting Meeting

ONE of the most interesting meetings that has been held by the New England section of the Electric Vehicle Association of America was that which took place in Lynn, Mass., December 14, at the works of the General Electric Company in this city. The members of the association from Boston and vicinity drove down over the parkways in electric carriages, all types being represented from the speedy runabout to the brougham and other enclosed styles. The ride was uneventful beyond demonstrating the practicability of the electric for touring purposes. Arriving at the plant of the General Electric Company the visitors were met by Fred M. Kimball, Morton J. Fitch, Charles H. Scott and other members of the G. E. staff and after being welcomed were escorted to the company's restaurant where dinner was waiting.

Mr. Kimball was toastmaster and the after-dinner speakers included Professor Elihu Thompson, Professor D. C. Jackson of the Massachusetts Institute of Technology, E. S. Mansfield, president of the N. E. section of the E. V. A.; W. B. Potter, chief engineer of the railway and traction department of the General Electric Company; Day Baker, president of the Electric Vehicle Club of Boston; W. C. Francis of the Boston Edison Company; L. D. Gibbs, advertising manager of the Boston Edison Company, and others.

The general topic of the speaking was electric vehicles, their past, present and future. Professor Thompson made a most interesting address, in which he told of the early days of electric carriage experimentation. He mentioned the uncertainties of the "ice wagon" age of the electric and deprecated the fact that the memory in New England of those days is still an obstacle against widespread popular use of a means of transportation that is enjoying such immense vogue all through the rest of the country.

Professor Jackson, who has made a special study of the electric vehicle, spoke of the great field of opportunity that is open to the electric in New England, and of its immense possibilities as a safe and convenient means of transportation. Mr. Mansfield talked entertainingly along similar lines, dwelling upon the work the electric vehicle dealers and the central station men are doing in co-operation to boost the electric for pleasure and commercial purposes. Mr. Potter spoke particularly upon the difference between trolley and battery vehicles, showing up the possibilities of the vehicles that carry their own source of power and those that derive their power from an outside source. He spoke of the development of motors for battery vehicles as accomplished by the General Electric Company. The other speakers dwelt upon the general advance that the electric vehicle has made within the last year, since a determined effort to popularize it in New England was inaugurated, and upon specific points of interest to the association.

Following the after-dinner speaking the gathering adjourned to the lecture room on the top floor of one of the new buildings, where instructive talks of a technical nature were given by some of the company's experts in motor vehicles and others. The speakers included A. F. Neale, agent for the Baker electrics; H. S. Baldwin, factory engineer of the G. E. automobile department; Alex. Churchward, the company's consulting engineer in New York; F. J. Stone, of the Electric Storage Battery Company; R. E. Russell and Col. E. W. M. Bailey, manufacturer of the Bailey electric.

HORSE ELIMINATION FOR PITTSBURGH

Pittsburgh, Dec. 27.—John M. Morin, of the department of public safety, has recommended to Mayor Magee the elimination of all horses and the installation of self-propelled engines and patrol wagons in the fire and police departments. Director Morin firmly believes that the efficiency of both these bureaus would be greatly enhanced, and a saving of $24,000 a year in the police and $4,000 a year in the fire departments made in this way. He estimates the cost of the 10 patrol wagons at $40,000 and of nine runabout automobiles for police inspectors at $6,750. He thinks the maintenance of these wagons for one year would be practically $10,000. He also recommends changes in the police and fire force and headquarters which will make the new patrol wagons do the work that would now require 15 under the present system. According to Director Morin it would cost about $631,000 total to motorize the Fire Bureau.

This estimate of the director's follows some very severe tests which recently have been made on Pittsburgh hills by three new auto-propelled chemical fire engines recently purchased by the city under the recommendation of Miles S. Humphries, chief of the bureau of fire. One test was made from Smithfield to Carson street. The machine carried 1250 pounds of ballast made up of 50-pound weights and the passengers carried on the trip had a combination weight of 750 pounds, making the total load 3000 pounds. From the starting point to where the engine stopped at Shiloh and Wyoming streets, Mt. Washington, is 3050 feet, of which 1114 feet is block stone pavement and 1936 feet dirt road. The elevation is 377 feet or an average grade of 12.3 per cent. The run up Sycamore street was made in 2 minutes and 12 seconds. At the top of the hill the car was taken to the head of the Monongahela incline and run to Sweetbriar street, a distance of one mile, which was made in 2 minutes and 10 seconds in spite of a number of heavy grades. Four hundred and twenty-two feet of the distance has a grade of 11 per cent., 300 feet 10 per cent., and 324 feet 9 per cent. The engine used was made by the American La France Company, of Elmira, N. Y.

FRIENDLY REORGANIZATION OF MAIS CO.

Indianapolis, Dec. 27.—Suit asking the appointment of a receiver for the Mais Motor Truck Company was filed in the superior court in Indianapolis recently by Harry S. Bloch, of Wheeling, W. Va., a stockholder. Mr. Bloch alleged that the company was insolvent and that it lost an option on certain real estate by reason of inability to make a payment of $5,000 on the property on November 15.

Thus far, Judge Collier of the court has fixed no definite time for a hearing on the petition, and it is said to be doubtful whether the case ever comes to trial. It is generally understood that arrangements are being made to finance the company according to present needs and that a mutual agreement will be reached to dismiss the suit.

Will H. Brown, president of the company, says there was no good reason for seeking a receiver, as the assets are about $140,000 in excess of the liabilities and negotiations are under way to obtain additional financing to meet the present situation. The company, since it moved to Indianapolis from Peru, which was followed by a reorganization, has apparently enjoyed a large business. Mr. Bloch asked in his petition that the operation of the plant continue under direction of the court.

A. S. Mais has resigned his position with the company and has become identified with the engineering department of the Studebaker Corporation.

HEWITT FORMS NEW TRUCK COMPANY

New York, Dec. 27.—It is announced by the financial interests that papers have been filed with the Secretary of State at Albany for the incorporation of the Hewitt Motor Company, with offices in the Borough of Manhattan.

In Jan., 1910, a combination was effected between the original Hewitt concern and the Metzger Motor Car Company, now of Detroit, with its truck department at 6-10 East Thirty-first Street, New York, of which Edward R. Hewitt, the engineer of the original truck company, remained in charge.

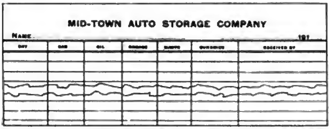
The new company, it has been learned, acquired from the Metzger company its interest in the commercial car department and will manufacture Hewitt vehicles in its own new factory and service station at West End Avenue and Sixty-fourth Street, as soon as the equipment has been installed, about Jan. 15th, 1912. Mr. Hewitt will have entire charge of engineering and construction.

The directors of the new company are M. F. Burns, E. C. Converse, Wm. E. Corey, E. R. Hewitt and A. Monel. The company has an authorized capital of $1,000,000, common stock only.

Garage Storage and Repair Systems

Simple Methods and Blank Forms Utilized in a Metropolitan Establishment to Insure a Square Deal for the Owner and Some Profit to the Garage Keeper

THE most peculiar thing about the garage and its conduct as a business proposition is that it does not pay; in fact few garages have ever been known to make money continuously for their owners; this, too, despite what customers consider unusually high prices, sometimes out of all proportion to the service rendered. As the commercial car business grows and increases the number utilizing the public establishment for want of a large enough fleet of cars to make a private structure pay or even break even is growing with equal if not greater rapidity. This is largely so in the bigger cities where rents and labor charges are so much higher that much smaller items become of importance and the whole situation takes on a more serious air.



MID-TOWN AUTO STORAGE COMPANY

Name 191

DAY	GAS	OIL	[illegible]	[illegible]	[illegible]	RECEIVED BY

FIG. 1—PORTION OF THE JOURNAL SHEET USED FOR KEEPING TRACK OF SUPPLIES

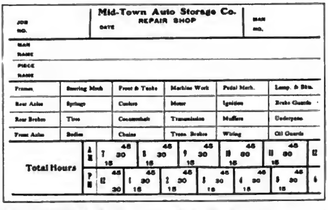
On the one hand the garage and service station keeper does not want to be unfair, because it is unprofitable if for no other reason, but he does not want to conduct his business for pleasure only—he must have a fair profit over and above the interest on his investment. If one particular place gets the name of being unusually high, too much so in the opinion of its steady boarders, they will leave for some other establishment and, moreover, spread the word around. For this reason as efficient service as is possible at a minimum of profit is the desideratum. To produce this the garage keeper must watch every small item, look for the very small leaks at all times, and, in general, keep his eye on the microscopic details of the business. All of which seems to lay stress upon the matter of the method of conducting this complicated business and the system of accounting and bookkeeping utilized.

Herewith is presented a set of the blank forms utilized by one New York City garage, the idea being to show how its business is conducted although it is granted that the Metropolitan situation is so different from any other as to render only the basic principle applicable to similar establishments elsewhere. In general the function of a system of this sort is to act as a check upon losses and enable the business man to tell at a glance or at least, in a few moments, just how he stands in a financial way. Early efforts in this line were crude, these being followed by over complicated methods, while the modern tendency is a minimum of system for a maximum of results, in short the smallest possible amount of red tape that will give the desired results to both parties concerned.

Lest it should be thought that the matter of very small items is magnified it will be well to mention a few things which the patron takes for granted, but which cost the garageman money, and thus stand as a loss on that particular transaction. For instance, getting a car out of the garage in a hurry when it has not been prepared previously may call for the momentary efforts of a floorman dusting and washing, a boy inflating a soft tire, a mechanic making a minor adjustment and a helper filling up the gasoline, oil and water tanks. It is conceivable that no one of these operations would take more than 10 to 15 minutes, too small an item to charge against the car owner, yet a moment's reflection will show that the expense of a high-priced mechanic taken off of another job for 15 minutes, plus the services of the other three for from 10 to 15 minutes will make a respectable total, even if no account be taken of the use of pumps, tools, duster, polishing liquid, other materials and the item of depreciation of shops tools, etc.

Without exaggerating it can be put down as an item for which the car owner should have been charged $1.00. This would not be done in the ordinary case, for without giving thought to it and enumerating the items, one would say, "only a couple of men for a few minutes, let it go." Yet multiply this amount by the number of times the happening is repeated in the course of a week at any busy garage and it may be seen that the loss will nullify the legitimate profit on a good many larger transactions.

Incidents of this sort might be multiplied indefinitely, dealing with the matter of allowing the steady boarder to help himself to oils, gasoline, grease, waste, water and polish, allow him the use of tools, both hand and machine, without charge, as well as all kinds of accessories in the way of tire pumps, etc. Then, too, there is the matter of wasteful labor in handling cars by hand when a turn-



Mid-Town Auto Storage Co.
REPAIR SHOP

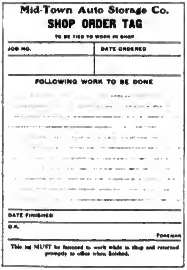
Job No.
Date
Man No.
Man Name
Piece Name

Frame	Steering Mech	Front & Tanks	Machine Work	Pedal Mech.	Lamp. & Btn.
Rear Axles	Springs	Controls	Motor	Ignition	Brake Guards
Rear Brakes	Tires	Countershaft	Transmission	Mufflers	Underpans
Front Axles	Bodies	Chains	Trans. Brakes	Wiring	Oil Guards

Total Hours							
A. M.	7 15 30 45	8 15 30 45	9 15 30 45	10 15 30 45	11 15 30 45	12	
P. M.	12 30 45	1 15 30 45	2 15 30 45	3 15 30 45	4 15 30 45	5 15 30 45	6

FIG. 2—REPAIR SHOP TAG USED IN MID-TOWN AUTO STORAGE COMPANY'S MACHINE ROOM

table would divide the expense by four or five, and many other items of waste due to insufficient equipment. Space prevents at this time a recital of these, but in the main the remedy lies in proper accounting systems, while correct methods of storing and caring for stock will eliminate one fertile source of loss. A strict adherence to the business principle of getting paid for anything one does, no matter how trivial the service, the installing of proper equipment to save time by making one or two men handle the work of five or six with less effort, the careful regulation of "dead" storage customers, charging for the use of special tools and advice usually given gratis, discouraging the practise of people doing their own work by making them pay for the privilege and careful attention to matters of minor detail often neglected in looking after the big things, will make many garages which are not now paying a profit show a balance on the right side of the ledger.


Mid-Town Auto Storage Co.
SHOP ORDER TAG
TO BE TIED TO WORK IN SHOP

JOB NO.	DATE ORDERED

FOLLOWING WORK TO BE DONE

DATE FINISHED
O.K.
Foreman

This tag MUST be fastened to work while in shop and returned promptly to office when finished.

FIG. 3—ORDER TAG, WHICH GOES TO OFFICE, STOCK AND WORKMEN

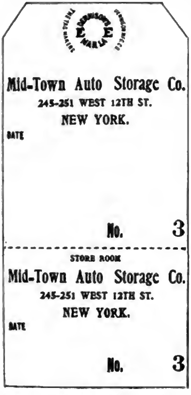
The Mid-Town Auto Storage Company is located at 245-251 West 12th street, very close to a large number of department stores, all of which have some more or less complete motor delivery system. It occupies a building six stories in height, one of which has been taken outright by Mack Bros. Motor Car Company and another by the J. L. Kesner Company, a new department store which has made a feature of its very complete delivery service with some 52 or more Grabowsky vehicles. The building is fireproof throughout, being built of brick walls with concrete floors on terra cotta arches and concrete faced steel columns. It is served by two large elevators.

The blanks shown are as follows: Fig. 1 depicts the form used for keeping a record of the oil, gas, grease, waste and sundries supplied to the cars. This is in duplicate and measures 8.5 by 11 inches, that portion shown being repeated the length of the sheet. These are in duplicate, a white and a yellow sheet, with carbon paper between. In this shape they are kept in tin frames hung in the oil room. Whenever the commercial car driver receives any goods and before he is permitted to remove them he must sign for the same in the last column. The white sheet being in front gets soiled from handling and is kept in the office, but the clean under sheet of yellow is sent to the customer with his bill. As this carries the driver's signature for everything there is no chance of a dispute.

When anything goes to the repair shop for either machining or hand work, the form seen in Fig. 2 is utilized. This is a simple time card, the workman filling the date, man, number and time occupied, while the foreman has previously assigned the job number, given the man's name and that of the piece. One of these is made out for every piece of work done, and from the data on these the office is able to figure the charge and make out a proper bill. This measures 6.5 wide by four inches high and comes in pads of handy thickness.

Aside from machine and similar repairs such work as naturally falls to the garage help is called for on the shop order tag, Fig. 3. This is five by 7.5 inches and consists of three copies. The first or white is for office use, and as the orders are filled out there this never goes into the works. The second sheet is yellow but otherwise duplicates the one shown. It goes to the stock room, while the third, a heavy manila copy, is for the machine shop or garage floor as the case may be. The shop has order books in which all work is filed. If the yellow slip like that shown does not go to the stock room clerk he will not recognize any other requisitions carrying this job number. This method acts as a double check on all materials to come out of the storeroom, and enables the clerk there to buy what is not on hand promptly, and usually before it is needed.

Fig. 4 illustrates the tag used in the storeroom for repair parts. This is on heavy manila, 2.5 by five inches in size, while the lower end forms a customer's check, being perforated to enable the workman to tear it off. The eyelet at the top allows of fastening the stub to the piece, while the reverse is plain. Fig. 5 shows a similar but larger tag utilized for transient motor trucks. This measuring 3.25 by 6.25 inches is attached to any vehicle which come in for work or supplies, but

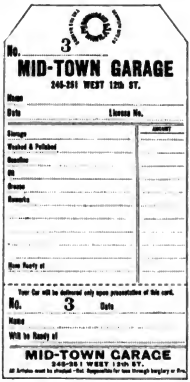

Mid-Town Auto Storage Co.
245-251 WEST 12TH ST.
NEW YORK.
DATE

No. 3

STORE ROOM
Mid-Town Auto Storage Co.
245-251 WEST 12TH ST.
NEW YORK.
DATE

No. 3

FIG. 4—REPAIR PARTS TAG ON HEAVY CARDBOARD


No. 3
MID-TOWN GARAGE
245-251 WEST 12th ST.
Name
Date License No.

	AMOUNT
Storage	
Washed & Polished	
Gasoline	
Oil	
Grease	
Remarks	
Now Ready at	

Your Car will be delivered only upon presentation of this card.
No. 3 Date
Name
Will be Ready at

MID-TOWN GARAGE
245-251 WEST 12th ST.
All Articles must be checked—Not Responsible for loss through burglary or fire.

FIG. 5—CHECK ISSUED TO TRANSIENT TRUCKS, WITH STRING

are not steady or regular patrons of the establishment. It carries a stub at the bottom which is issued to the driver, the items on the stub being self-explanatory.

A special sheet for the loose leaf ledger is used for keeping track of all accounts, this not being reproduced. It measures 6.5 by 12 inches in size, perforated at the left. On one side 22 columns allow space for carrying as many individual items or parts on the car, while the reverse is ruled across and has more the general appearance of a ledger page. This is divided off with date lines at the left and debit and credit spaces at the right with place for the names of the account between. This forms a very important part of the system, as it minimizes the books and bookkeeping. When an account is closed, the sheets can be removed to a separate binder and filed, but while active the one book fills all requirements except shop orders, time cards and the journal sheets previously shown. The whole makes a system which is not only small and compact but reliable and efficient. Moreover, by giving up a sheet of the loose leaf ledger to a summation and keeping it up to date, the proprietor can tell the condition of his business.

Unusually Successful Electric Vehicle Banquet

BOSTON, Dec. 19.—Representatives of the State and city governments, central station men and members of trades allied to the electric vehicle were the guests of the Electric Vehicle Club of Boston, at a banquet given this evening at the City Club. It was a large and enthusiastic gathering, at which the electric for passenger and freight carrying was boomed by the speakers and a rosy future with all the street traffic in Boston electrified was predicted. William H. Blood, Jr., president of the Electric Vehicle Association of America, who presided, enunciated the slogan, "electrocute your horses and electrify your business," and it caught on quickly and was the theme around which most of the addresses were made. The principal speaker of the evening was Hayden Eames, of Cleveland, the motor vehicle expert. Day Baker, president of the Electric Vehicle Club, opened the after-dinner speaking by reading telegrams and letters from electric vehicle men and associations in different parts of the country, including one from Thomas A. Edison.

Introductory remarks of Day Baker were in part as follows:

In behalf of the Electric Vehicle Club of Boston I desire to welcome you to our banquet this evening. In view of the prosperity which we have had the past year the members of the Electric Vehicle Club desire to have you assemble about our board and tell you briefly of what we have been doing in this section of the country, and also show you what others are doing for the advancement of electric vehicle economy and reliability in other parts of the world.

I wish to extend to you all the hearty greetings of the Electric Vehicle Club and at the same time introduce to you a gentleman who stands in the highest esteem with all the electrical industries of the country.

It has been the pleasure of the members of the Electric Vehicle Association of America, which represents all of the manufacturers of electric vehicles and the great manufacturers of electric current, to honor this gentleman with the highest gift we possess, the Presidency of the Electric Vehicle Association.

Gentlemen, it gives me pleasure to introduce W. H. Blood, Jr., president of the Electric Vehicle Association of America.

Mr. Baker presented Mr. Blood as the presiding officer and he said:

Mr. Chairman and Guests: I fully appreciate the honor of being asked to say a word here to-night, and, representing, as I do, the Electric Vehicle Association of America, I should feel that I had committed an oversight unless I took advantage of the opportunity.

I shall say but a word, because I know of the great treat which is in store for you later in the evening. While our speaker has not the charming voice of his accomplished sister whom you have heard so recently in the Boston Opera, the message which he brings to you is of such importance and will be so well presented by him, that I am sure it will give you pleasure to listen to him.

The Electric Vehicle Association of America is an organization whose chief object is to promote the use and adoption of electric vehicles for both pleasure and commercial purposes. It is simply undertaking an educational campaign to let the country know that the experimental days of the electric vehicle are past and that the product which you are asked to buy and use to-day is the real solution of the transportation problem of our larger cities. In the first place, transportation of merchandise by electricity is a cheaper method than by any other means. This can be substantiated by facts and figures. Almost all of the brewers in New York City have adopted electric trucks for delivery purposes, and they certainly did not do this for sentimental reasons. The large department stores are fast changing over from horses to electric automobiles; the express companies are ordering electric trucks in large quantities. The elimination of the horse from the congested streets of Boston would give us fully twice as much room, and, because of the greater speed of the vehicles, much more merchandise could be handled in a day. When I tell you that something like 25,000 tons of merchandise is handled over the streets of Boston on the average every day you will realize what this may mean.

From a humanitarian standpoint the use of the electric vehicle is justified. In the four cities of New York, Chicago, Philadelphia and Boston, during the hot wave last July, 3,752 horses died of exhaustion. This carried with it a property loss of about $1,000,000.

From a sanitary point of view, the removal of horses from the crowded streets would be welcome, for it would reduce the dirt nuisance to a minimum and would relieve us of most of our flies, which are well recognized as the probable carriers of many of the contagious diseases.

These are just a few of the reasons why we should change from horses to motor transportation. One of our facetious members has said that the slogan of this organization should be "electrocute your horses and electrify your business." Of course we do not expect to go quite as far as this, but we feel confident that if the proper means are taken to introduce electric vehicles in Boston we will not only have a bigger, better, busier Boston, but this will be the means of bringing about a clean, convenient, comfortable and charming city.

LaRue Vredenburgh, of the Edison Electric Illuminating Company, officiated as toast master and introduced as the first speaker Lieut. Henry D. Crowley, a member of the staff of Governor Foss, who brought the greetings of the commonwealth. He presented some interesting figures showing what the State has done for the automobile in the way of providing improved roads, and in turn what the automobile has done for the State in contributing to the cost of its road work.

Mr. Eames discussed at some length the development of motor traction abroad, referring to the steam lorries that were early in use in England, and describing methods that are followed by the great London bus companies, methods that would not be tolerated here. He showed the superiority of the electric car over the gasoline for bus purposes by reason of the fact that it is less liable to injury and to consequent retirement for a long period to the repair shop. Continuing, Mr. Eames said:

> It is the urban more than the interurban traffic which we are particularly interested in in this country, although the interurban development for motor traffic is an increasing possibility. Beginning next month, for the first time in the history of this country, the United States Government is to experiment in auto-company wagons for the military service, running from Indianapolis to the South. This is the first time military wagons have been used and it will demonstrate the practicability of this sort of wagon over the horse-drawn vehicles.
>
> To illustrate this I can cite one large stable where electric wagons were installed. The cost for horses in this stable was $94,000 and the cost of electric vehicles $166,000. The horse expense amounted to $136,000, while the machine expense amounted to only $113,000, which showed an annual saving of $23,600 on the machines. In all the big industries where electric vehicles have superseded the horse annual savings have been recorded. Anyone hearing these stories naturally asks why the electric vehicle has not been more fully exploited long ago. The only answer to this is inertia.

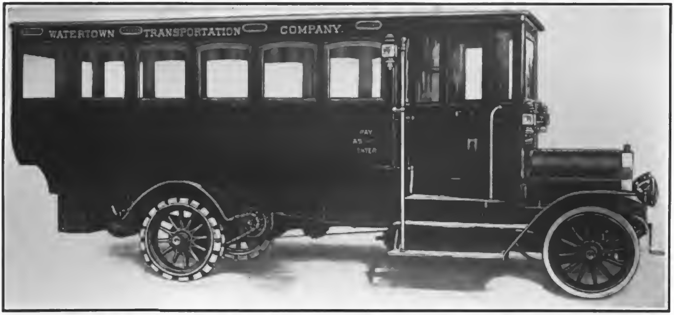
Mayor Fitzgerald urged the advantages that Boston offers for the use and manufacture of electric vehicles, pointing out its miles of parkways and boulevards within easy reach of the center of the city, and its excellent facilities for factories near the water front. Day Baker gave an illustrated talk describing electric vehicles in use abroad showing lantern slides of fire trucks in Berlin, Hamburg, Hanover, Essen, Basel and Paris, the electrical equipment at Springfield, Mass., street cleaning apparatus here and abroad and other interesting illustrations.

The dinner was in charge of F. J. Stone, W. H. Blood, Jr., E. S. Mansfield, D. Baker, J. S. Codman, H. W. Moses, L. D. Gibbs, P. E. Whiting, F. N. Phelps, C. A. White, H. C. Converse and D. C. Tiffany.

FINE COACH WORK ON WATERTOWN BUS

Watertown, N. Y., now has a bus service, recently installed to compete with the street cars on short hauls and in a number of instances over streets through which the latter cannot obtain a franchise. The vehicles are the product of the Knox Automobile Company, Springfield, Mass., and the bodies fitted possess a number of unusual features of merit. They are to run in the exclusive residential section and look more like private limousines than passenger cars, although limited to carry twenty-eight passengers.

The men operating the line gave the Knox company carte-blanche to produce the finest thing possible and the result is the culmination of the experience of the engineers and designers of this well-known automobile manufacturing concern. The driver is conductor and motorman in one. He occupies a separate vestibule in the door of which is a fare-box and change window. The operation of the main door is controlled by means of a lever reaching to the driver's seat. The vehicles are heated by leading the water from the motor through pipes under the seats instead of through radiators.



HIGH-GRADE BUS RECENTLY PLACED IN SERVICE AT WATERTOWN, N. Y. MADE BY THE KNOX AUTOMOBILE COMPANY, SPRINGFIELD, MASS.

TWENTY TELEPHONE TRUCKS NOW

With its latest acquisition of Sampson commercial vehicles the New England Telephone and Telegraph Company now possesses a total of 20 machines, 17 of the 3000-pound size, two of 1500 pounds capacity and the first one purchased which handles four tons. The fleet operates from a central station in Boston out to various smaller cities in the State, supplying materials for repairs.

Mechanical Notes for Truck Drivers

Care of Steering and Axle Parts

The cold weather and slippery pavements of the winter season bring about many troubles for the commercial car driver. For one thing, the low temperatures congeal the oils and greases used, so lubrication becomes poor, although a sufficient quantity be used. Then, the snow and splashing water washes away a lot of lubricant. In the steering connections the glassy pavements of freezing weather and the general tendency to slip at other times, makes care and forethought necessary.

Not only should the oiling precautions be doubled, but all parts should be examined for wear with greater frequency and more watchfulness than at other times. The sketch herewith of a steering knuckle and axle and in section so as to show the bearings, brings out a number of these points. With reference to the rollers upon which the wheels turn, these should be supplied with certain and copious lubrication, they should be looked over for end play, and any that is discovered taken up by means of the nut. The latter should be scrutinized for worn or crossed threads, and, if any are found, a file may be needed to correct them in some cases.

Worn or broken cotter pins should be replaced by new, but if the holes have worn somewhat so that the pins are loose a larger size should be put in. All nuts must be pulled up tight. As for the knuckle through pin, this must be tight in the upper and lower parts of the axle or else its bearings need replacement. The thrust bearing should be tight in both directions or it needs adjustment. Back of the axle the cross connection and steering rod should be inspected for wear or shake. Bent rods should be straightened, ends which need lubrication covered with a leather boot and all other possible precautions taken to have this part of the car as nearly right as is possible.

Repair Work and Soft-Headed Hammers

A large proportion of commercial vehicle repair work calls for the use of a soft-headed hammer. Thus, in driving off shafts, gears or other parts which have a thread at the end, it is necessary to interpose a soft material between hammer and threads or else use a form which is soft enough to do no damage. Similarly, in replacing the part the same care must be exercised. The use of a block of wood or chunk of leather is all right, but the former soon becomes broken so that a new piece is required, besides which it is always difficult to find when wanted. As to the latter, it is equally hard to discover when desired, while it readily gets oily and slippery.

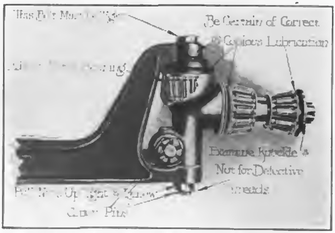
The special form of hammer has many advantages; it can be utilized for other kinds of work; it is large enough and prominent, so that it can be found readily, in fact, usually it is included in the tool kit; it is not hard to make, nor expensive, but saves much money in replacements, and in other ways is a desirable addition to the equipment and saves the driver much time.

The sketch herewith depicts three forms, any one of which may be made easily and quickly. The first, that at A, is constructed from a single thick piece of fiber, which is placed between two sheets of lead, the whole cut circular or rectangular as desired, and then pierced with a hole for the handle. This material may be obtained in any desired thickness, but 2 inches is advised for this purpose. At B is a similar form, but constructed from thicknesses of leather laid one on top of the other until the desired total is reached. As .375 inch is about the maximum for single sheets, five or six thicknesses will be needed. These may be glued, nailed or otherwise fastened together, a good plan being to have the bolts or rivets which hold the lead discs together pass through the leather and hold it, too. As before, the shape may be anything desired.

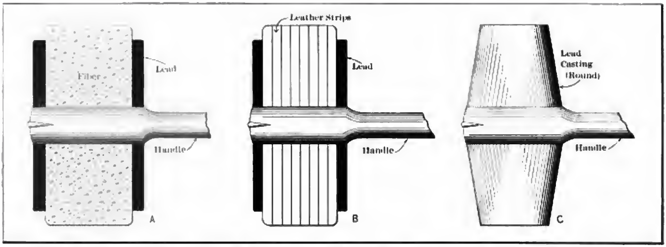
An all-metal shape is seen at C, this being a lead type, cast in a single piece with a hole for the handle. The pattern for this can be made in 15 minutes, while anyone can mold and pour it. Lead is easily melted in any old metal vessel. If handled with care this will last the ordinary truck driver for nearly a year. A similar form to C may be made from copper if desired, but the metal will cost about three times as much and the resulting hammer be no better.

Keeping the Radiator Warm Enough

Strange as it may sound, there are many days in the winter, particularly in northern climates, when it is almost impossible to keep the radiator warm enough to do the work it is supposed to do. By this reference is had to the fact that a motor is more efficient at high temperatures than at low; in fact, as soon as the jacket water drops much below 150 degrees there is a noticeable falling off in power. When the thermometer falls down to zero and below the water is liable to go down in about the same ratio. This being the case, it becomes necessary to keep the radiator from getting so cold by



SECTIONAL VIEW OF AXLE AND STEERING KNUCKLE SHOWING SOURCES OF TROUBLE

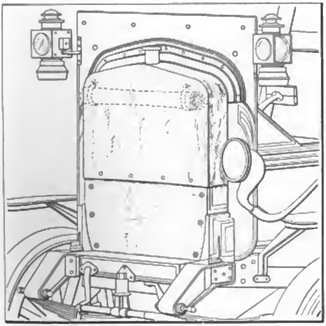


THREE FORMS OF SOFT-HEADED HAMMER WHICH THE TRUCK DRIVER CAN MAKE AND WILL FIND EXTREMELY USEFUL IN REPAIR WORK

preventing cool air from reaching it quite so readily.

This is done by placing a cover over the front, as, for instance, that shown in the accompanying sketch. This is a method which permits of complete or partial covering, as the case may be. A cover is made from canvas, oilcloth or leather, the lower portion being fastened to the cooler by through bolts or rivets, as shown. The upper part is formed to the radiator shape and attached to the dash or surrounding framework in such a way that the central flap may be rolled up. To hold this up a pair of straps are attached to the top and buttons fixed to the bottom of this flap for its attachment. The lower part as well as the upper carry additional buttons where they overlap.

The illustration depicts the whole front covered and the material buttoned down in place, as for a very cold day, say, when the thermometer stood at 10 degrees or lower. In case it should rise to 45 or higher, the driver simply unbuttons the lower and two vertical edges, then rolls it up and fastens with the straps as shown dotted. If it is feared that the radiator will be kept at too high a temperature, a central opening, either square or round, may be left in the flap. Experience will soon prove the lack of any real necessity for this.



METHOD OF PROTECTING THE TRUCK RADIATOR IN EXTREMELY COLD WEATHER

Lubricant Attention and Alterations

The oil in the crank- and gearcase will grow stiff and heavy with cold weather, and the novice driver of a delivery wagon or other commercial vehicle should be advised of this and the remedy. Late in the fall, as soon as the cooling solution is changed, the heavy oils and greases should be drawn off and lighter ones which will not congeal as readily substituted. Generally, it is sufficient to replace with a form which is the next higher on the list, but where a maker has but few it may be necessary to change to a different lubricant.

When the gearbox is filled with a heavy oil, the next lighter one will fill the bill, but where a combination of grease and oil is made use of, this mixture should have the usual amount of oil added to it, making the oil content just twice as great. That is, if a gallon of oil and one of grease have been sufficient previously, now it should be changed to two of oil and one of grease. The same precautions should be taken with the differential case when this is a separate unit from the transmission, although it usually carries outside grease cups, and the character of the interior matters little. Where inside lubrication is used the change should be made as recommended above for the gearbox.

Miscellaneous Notes of All Kinds

In replacing a rod end, particularly one of the yoke type, the driver should be careful to put the cotter pin at the bottom. If at the top, when it falls out, the pin will drop out also.

It is a good plan to make a neat connection for all ignition wire and after finishing it place a drop of solder on it so as to hold wire and terminal together. This makes a better electrical connection and is more permanent and useful in every way.

In cleaning out crank- or gear-cases with an electric light nearby or used inside the case, care should be taken that this is covered. Otherwise it may strike the metal, break inside the case, and necessitate doing the work of cleaning all over again.

Impediments in Introducing Trucks*

Speeding the Horse Driver Up to the Pace of the Motor Vehicles Is One of the Big Problems to Be Wrestled With—Methods of Handling Small Packages, Fruits and Crates—Problems That Work for the General Economy of The System—Loss of Time Is the Fatal Impediment

By HAYDEN AMES

IT seems to be a habit of the practical mind to try to stretch its own specialty to the solution of every problem it encounters, whether obviously fitted for it or not. For many years this tendency, directly or indirectly, delayed the work of introduction of power wagons more, perhaps, than any other. Those most interested in the introduction of the power wagon during these years were engineers; very few others were interested at all, and, in consequence, took the engineers' point of view on faith. For a matter of 10 years, hardly a month went by that we were not treated to the information that such and such an engineer had solved the power-wagon question, whereas, as far as the engineer was concerned, it was already solved, as there is ample evidence to prove the superiority of the power wagon over all other kinds of road transportation, at least as long as 10 years ago. Whatever improvements the intervening time or the future may have made or will offer, the mere engineering problem could properly be considered to have been solved when the new method afforded superior convenience and economy over then existing methods without corresponding sacrifice.

The peculiar mental bias cited in the opening phrase of this article, however, concentrated the attention of those interested upon the search for some engineering solution, and they were correspondingly diverted from any attempt to remove the true impediments to the introduction of the power wagon during that period, which were almost exclusively administrative and psychological, and in a less degree financial. In view of the large number of former inventions which are publicly known to have gone through the same experience, the difficulty of diverting the attention of those interested as well as the public from the engineering question seems amazing when regarded in retrospect.

While the introduction of the power wagon has made some progress during the period named, it is still conservative to say that the surface has not been scratched. Power-wagon failures are still being reported by people who are trying to use the new machine in the old way; who, unconsciously, are limiting the capacity of the power wagon by the practices of draft-animal days. The first electric pleasure vehicle I ever saw was supplied with a whip socket, for which the body-maker's only excuse was "Because we had always been in the habit of putting them on." A recent alleged failure of power wagons reported to me was almost as hopeless of cure as though the owner had insisted on putting oat-bins into his machine shop; in fact, the cause of failure was somewhat analogous. It is this that we have to contend with. It is mainly to overcome this mental attitude, directly or indirectly, that the Electric Vehicle Association of America was created—of course, as a means to another end, but, nevertheless, that is the direction in which its weapons have got to be directed if it is really to be of any service to its projectors. Unfortunately, it is not only going to be necessary to directly educate owners and prospective users of power wagons, but their employees, even to the drivers, who have in most cases got to modify their points of view and methods before the introduction of power wagons can be general.

Like much other labor-saving machinery, especially in the transportation field, the power wagon speeds the men up all along the line. The operators, although much fewer for a given product, have to work harder and faster, but almost invariably obtain their compensation from shorter hours, perhaps not in proportion, but still to an agreeable extent. The increased speed is the first thing the driver feels. It takes him some little time to find his own advantage.

A good illustration lies in a story which was told me by an Adams Express agent in Buffalo some eight or nine years ago. At that point and at that time the Adams Express Company had the first really successful installation of electric vehicles. Owing to a poor selection of the size of the vehicles in relation to the routes covered and the service to be done, the station was not as economical as it could have been made, but it was at that time an exceedingly well operated station, and in all probability was at that time, in spite of the above mentioned handicap, delivering express packages more cheaply than it was being done anywhere else in the United States by any means whatsoever. When the wagons were first introduced the drivers immediately felt the exactions of the greater speed; they felt themselves speeded up, and they were loud in their denunciation of the whole scheme. They rejoiced in every accident that occurred and took delight in the misfit electrical conditions under which, at first, the vehicles were charged. At the time I speak of the whole station had changed. The drivers had discovered that, instead of being dragged back from the last package on distant routes at a very slow rate by a tired horse, the electric express wagon now running light brought them back at even a faster rate than that at which it had been running during the day. As one of them said to me: "I can deliver all my packages now and get home a half hour sooner than I used to." At that time the express agent offered by buy a new team with brass trimmed harness for any one of the electric wagon operators that would drive it, but it was rejected with scorn.

Perhaps the commonest of all bad practices is that of applying the power wagon to a delivery route previously operated by a horse wagon of the same size, and limiting it thereto. The difference in the actual cost of operation between a given size of horse wagon and a given size of power wagon is seldom in favor of the latter, and this is true, also, of the first cost of the complete unit. The principal economical virtue of the power wagon lies in its character of labor-saving machine. Under almost all conditions the price of drivers is the largest single item of expense. Taking the station hands, the payroll is always the largest single item of expense.

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*Paper read before The Electric Vehicle Association of America, October, 1911.

It does not seem to take an Isaac Newton to realize that, if the work of a man operating the new machine is arbitrarily limited to only what he can do with the old, nothing is gained. In all regular delivery systems the problem is not only to lay out the routes to fit the new machine, but to select the machine sizes so that the largest possible machine that can be fully loaded will completely empty itself over a selected route in a man's day's work. This extremely simple mathematical thought seems to be almost incomprehensible to the majority of power-wagon users. In some express companies, and others, whose principal business is city transportation, certain routes have become a positive institution, and, although usually originally of an entirely arbitrary selection, are assumed to be as immutable as the value of π. This sounds like a joke, but it is anything but a joke to those of us who have been frequently called upon to demonstrate the superiority of power wagons over draft-animals. Those who have not had the experience will be perfectly surprised at the frequent high grade of intelligence which declines to rid itself of the inherent necessity of operating on these time-honored routes.

We are, however, occasionally treated to a refreshing case of independence and directness in the substitution of power wagons for horse service.

In the fall of 1901 the Adams Express agent in Pittsburgh put in service at East Liberty a light electric express wagon, and in doing so gave instructions to the agent at that point, against the latter's protest, that he should "lay off all four of his horse wagons and do his work with the electric," that he (the Pittsburgh agent) would decide later whether he would allow him any of the horse wagons back or not.

This was certainly taking the bull by the horns, but as the East Liberty agent's job was at stake the result justified the risk, and only one wagon of the four was put back into service, and that only as an extra. Of course the intention of this barn-yard approach could easily have been defeated had the size and speed of the wagon been unsuitable to the service to be performed.

A good example of what it means to speed up, not only the operators, but the daily routine and methods, is afforded by the ordinary practices of our great express companies when horses were a rule with them.

I have before me a careful plotting of ten established routes of different express companies in New York City made in the Spring of 1902. You will probably be surprised to discover that from the time the horses left the barn in the morning until they got back at night the teams were standing still 40.4 per cent. of the time, the maximum idleness on any one route being 64.25 per cent., the minimum 27.25 per cent. At least 50 per cent. of this is due to the fact that the gait of the man matched the gait of the horse. The draft-animal belongs to a slow age and the man who drove him as a rule adapted himself to it.

If any one is in doubt as to the reality of this effect, let him observe the Egyptian plowman with his water buffalo. The ordinary plowman is slow enough, but the Egyptian's movements suggest the chameleon. The ordinary draft-animal operator grades up from this on the way to the operators of machines. But the accessory facilities have also been accommodated to the draft-animal, and are, correspondingly, impeding its successor. The methods of loading and unloading and of handling packages, the shipping-room arrangements and routine and even the unnecessary time (assumed to be necessary), even with the existing facilities, are all adapted to the gait set by the horse, and all tend to deprive the machine owner of his advantage; and, remember, these speeds are not set to what the horse can do or necessarily actually does, but what he *may* do. Long practice has subconsciously led to their adjustment to the uncertainties of the horse in spite of the goad of competition. If you have to allow a half-hour's leeway in 25 per cent. of the cases in which a horse has to make a two-hour trip, what is the use of trying to save 15 minutes of a half-hour's loading time?

This, roughly, illustrates the subconscious mental process by which all these measures accommodate themselves to the horse, and may indicate, generally, why they have all got to be changed before the power wagon will be generally acceptable without question. Those who have been through the experience cannot fail to recall the effect of the power wagon on this condition.

I have before me a plot of the far east Brooklyn route of the New York Transfer Company, both with horse service and with electric vehicles. This involved the operation of what is known as a route wagon and no opportunity whatever was afforded at the time to modify the route or take any other direct advantage of a labor-saving character of the power wagon. During the trip the team stood still 30 per cent. of the time, but the power wagon stood perfectly still only 22¼ per cent. of the time. The actual difference between the idle periods of the two outputs was three-quarters of an hour, but the power wagon completed the service one and one-half hours before the team.

The experiment was not made for the purpose of introduction in that instant, but, in combination with other available routes, indicated to the demonstrator at once the immense saving that could have been accomplished had the education of the drivers, and the speeding of the package handling, the proper arrangement of shipping rooms and wagon interiors to that end and the reconciliation of wagon capacities and route arrangements been immediately begun. But, perhaps, it is too much to expect that the development of special mechanical facilities for loading and unloading will precede rather than follow the new method.

The reality of the impediment which present handling facilities interposes to the introduction of power wagons can be illustrated by a case I once came across of a high grade dry goods company in one of our largest cities, whose installation of electric vehicles could not be made to pay. Examination developed the fact that no effort was made to crate or handle the packages in the waiting room with any reference whatever to the respective routes upon which they were to be delivered, and that the routes were laid out with equal disregard to the shortest possible empty haul; following their practice with draft animals, the wagons were driven to the opening points of the routes, and, extraordinary as it may seem, the packages were all taken out of the wagons and spread along the beds of grass between the curb and sidewalk. Some of the wagons carried one boy and some two boys, each with a large canvas bag. Each boy pawed over the pile of packages and selected and put in his bag the packages belonging to the block that he was to cover and those that were left the driver took back into the wagon and drove to the point at which the boys were respectively expected to finish their bags. Rather than this the firm should have abolished its entire wagon system and employed boys to carry the packages on public trolley cars.

(To be continued)

Commercial Car Questions Discussed

Four-Speed Transmission

Editor COMMERCIAL VEHICLE:

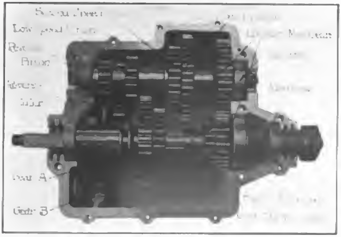
(5)—Will you please advise me if any of the prominent trucks sold in this country are equipped with four-speed transmissions? If there are any, what are the advantages claimed for them? Would not the extra gearing add weight to the whole vehicle for which there was no corresponding saving? JOHN W. GOWAN.

Jersey City, N. J.

There are a large number of the better class of trucks in this country which are equipped with four-speed transmissions, the list being much larger than one not having given it thought would suppose. According to the specifications published in the January, 1911, issue of the COMMERCIAL VEHICLE there are at least 14 makes so equipped. These are: Brodesser, Kelly, Panhard, Rapid, Gramm, Kissel, Schleicher, Saurer, Utility, Sampson four and five-ton, Commer 5.5 and seven tons, Stegeman six-ton, and White. The latter is illustrated herewith, the view being a plan which shows the gears.

In this it will be noted that there are two shifting members, one a double gear and the other a single but made with jaw clutches so as to be equivalent to another. The latter moves to the extreme right to engage with one of the constant mesh gears, to give high speed. Then it is slid to the left to a position opposite the third speed gear. The other shifting member consists of two parts, marked gear A and B. When moved to the right B engages with the second speed pinion. At the left A meshes with the low speed member, while at the extreme left it comes into contact with the reverse idler, through the medium of which motion is transmitted to the pinion.

The advantages claimed for the four-speed gear are as follows: It allows a more even and finer division of the whole range of speeds, which in turn permits of running the engine at a more constant speed, this being more economical. It makes gear changing more easy and the driving system less liable to shocks due to differences in speed between engine and the other parts, since the interval between any two rates of travel is less. In the hands of an experienced driver the additional speed becomes an excellent time and fuel saver, since regardless of the condition of the ever-changing traffic there will be a speed which is suitable to each case. The additional weight put on a three-ton or heavier truck by one extra gear, another notch in the quadrant and perhaps 1.5 or two inches added to the length of the transmission and its two shafts is so insignificant as not to merit attention In the case of the member shown it is doubtful if the difference would amount to 15 pounds.



FOUR-SPEED TRANSMISSION USED ON WHITE MOTOR-DRIVEN TRUCKS.

Advantages of Light-Weight Trucks

Editor COMMERCIAL VEHICLE:

(6)—As a subject for discussion in your correspondence columns is it advisable for a vehicle manufacturer to reduce his chassis weight through refinements of design, simplification of parts and the use of better steels? That is, would possible and prospective purchasers be able to see the difference in the cost of repairs, tires, depreciation and other items of up-keep to the extent of paying the necessarily greater price for such a vehicle, which redesigning and alloy steels would require? It seems to the writer that an exceptionally light-weight chassis can be shown by statistics and actual operating costs to possess numerous advantages over the heavy-weight construction to such an extent as to warrant a higher sales price. The former type would not net the manufacturer any greater profit, but would redound to his credit since the vehicle would give more satisfaction in every way, last longer and give superior service while it lasted. In this way, too, it would bring greater credit upon the industry as a whole.

New York City. R. W. HUTCHINSON, JR.

There should be a strong demand for a vehicle of the very highest grade, such a one including the use of the strongest alloy steels naturally fulfilling the above conditions. There is little doubt also that this class of car should be a better buy than one in which more ordinary material is utilized, requiring very much larger cross-sections to produce equivalent strength. This results in a car which runs high in weight, whereas the excess over the first form of car does not serve any useful purpose.

In fact, it does more—it represents a dead loss every mile the car is run, in tire cost and depreciation, in vehicle cost and operation—while from an efficiency point of view the whole outfit shows up more poorly; that is, the ratio of load carried to weight empty is very high. Were the other form of car used, the load carried would be large in proportion to that of the chassis and body only, showing a high carrying efficiency.

It is extremely difficult to estimate the difference in tire cost a mile or in vehicle cost a mile, but relative to the former it has been stated that the wear on rubber varies as the cube of the load, so that adding a weight of 500 pounds to a three-ton truck weighing 6,500 pounds which served no useful purpose would increase the wear and consequent cost in the ratio of 1,953,000,000 to 2,197,000,000, or would add 12.5 per cent. Similarly, 1,000 pounds added would make a difference of 26 per cent.

If the vehicle did 150,000 useful ton-miles a year, the dead ton milage would be approximately 162,500. Adding the same amounts as before, the latter figure would be increased by 7.7 and 15.4 per cent. respectively. Considering an average tire cost of close to three cents a mile the first named consideration would increase this to 3.75 cents, while if other items in the total expense be lumped at 3.5 cents and the 15.4 per cent. increase put on this, it becomes 4.04. Adding the two, an approximation to the average yearly cost a mile is 6.5 cents without and 7.79 cents with the increase. Any thinking business man could be convinced of the advantage of saving this 1.49 cents for every mile and on every vehicle, even at an addition of 10 or 15 per cent. to the first cost.

How to Become a Truck Driver

Editor COMMERCIAL VEHICLE:

(7)—Will you kindly give me some idea of the way I should go about it to learn to become a motor truck driver? I am now and for some time past have been driving horses in New York, but feel that there is more money and better opportunity for me in the other line.

New York City. P. J. FOGARTY.

Yes, the opportunities are much greater for the motor vehicle man, besides which this is to be the broad field in the future, while horses, in the Metropolis at least, will dwindle down to such a small number that driving positions on them will be few and far between. It is a matter of fact that the majority of owners of commercial cars pay more to the drivers of these than to their horse drivers. One well-known department store which gives its horse drivers $14 a week pays truck handlers $16; still another make a difference of $3 a week.

There are several methods of going about this matter, any of which may be successful if carried through to conclusion. The first, easiest and probably cheapest but slowest, is the home study or correspondence plan. In this, you secure books telling of the construction and operation of automobiles and motor trucks and study them at home, allotting yourself a certain number of pages each day or week. Then, spend as much time as possible around garages, salesmen and friends who own or drive cars, learning what you can of the principles and operation in this manner. The latter information will supplement the knowledge gained by study. Finally, take a set of lessons in actual driving from some friend or acquaintance, paying for these if necessary.

A more rapid, possibly more thorough but harder and more expensive, way is to attend a school, of which there are many excellent ones in the city. Here you will get the theory in the proper sequence, followed by practical illustrations; later when prepared for it the driving and operating lessons, and finally some knowledge of possible accidents and the manner of handling repairs for them.

This plan would necessitate giving up the present position for the four or five weeks needed to complete the course. If taken up enthusiastically and followed through to a conclusion, this will be the most satisfactory in the end, since a position will be available at higher pay almost as soon as the course is concluded, in which the difference in salary will soon make up for the time lost as well as the cost of the lessons and books. The home study plan is apt to be a haphazard one unless you have a friend to plan the work; it is difficult to see that you are making any real progress or that you are working along the right lines, and the work is apt to string out through many months, so that real action is deferred for a long time. The correspondence method would be along the right lines and systematic but fairly expensive and long.

Motor Truck Cost Figures

Editor COMMERCIAL VEHICLE:

(8)—As a subscriber to your valuable magazine, I wish to ask you if you can furnish any data regarding the relative cost and saving between a motor truck and a horse-drawn vehicle. Any figures that you may be able to furnish will be greatly appreciated.

Newark, N. J. CHAS. F. DOUGLAS, JR.

Any data that could be given in this connection would be of little or no value, as the conditions under which commercial vehicles are operated vary widely. The question of care in operation would also enter, thus involving the human element. When the speed and carrying capacity of the average large motor truck are compared with those features of the horse-drawn vehicle the former would seem to have sufficient advantage to counterbalance its increased cost and expense of maintenance.

Moreover, the class of service is not stated, and this has a large influence upon the results obtained. That business which keeps the vehicle occupied the greatest portion of the working day shows the lowest cost a mile or a ton, while the one in which the work is intermittent with long waits reveals the highest expense. A number of practical examples will be given in these columns during the year, the first appearing in this issue.

From figures covering over 100 gasoline trucks, it has been found that the operating expense is about six cents a ton mile, while for the same number of electric trucks this item becomes seven cents a ton mile. These figures are exclusive of drivers' wages and garage expense.

Body Building Interesting

Editor COMMERCIAL VEHICLE:

(9)—Referring to the article by F. Nelson Carle, of the G. V. Company, that appeared on page 617 of your December issue, believe that his points regarding standard bodies are well taken. Your criticism, relative to the building of chassis only, in having the body builders of the various cities throughout the country build the special bodies, is the way a great many concerns are handling this, but the question arises: Are these local body builders putting the proper material in and building the bodies of ample strength? As we all know the commercial car body is a serious question, owing to the increased speed and greater loads. The general tendency has been for the carriage and wagon-drawn vehicle builders to get their automobile bodies too light. We have given the body building question due consideration and, after many tests and trials, know now that only the best body should go on a commercial vehicle regardless of power.

Anderson Electric Carriage Company.

Detroit. A. C. DOWNING.

MUNICIPAL VEHICLE SERVICE EXTENSIONS

Wide Opportunity for Army Ambulances

Each year the Seventh Regiment of New York City goes up the Hudson river for a two weeks' stay in camp, during which a sham battle is fought with the cadets from West Point, which is not far away from the encampment. In the past summer this was notable for the use of an ambulance, a White vehicle having been pressed into service. This was driven by George Robertson, an officer in one of the companies of the Seventh.

This was literally a great surprise to the regimental officials in that there was not a single moment of the 14 days when it was not doing some work previously done by horses or men and doing it better, quicker and more efficiently. It hauled all of the officers' baggage up from New York City in a few hours, and after the two weeks had elapsed carted it back in quick time; it acted as commissary wagon, handling all meats and other provisions from Peekskill nearby; it carried injured men to the field hospital, and in at least one case took a man seriously injured by a fall from his horse to the larger and well equipped hospital at West Point in sufficient time to save his life, which would have been lost, said the doctors, had horses been used. In many more ways its work was a great surprise and a revelation to the army officials, who have made its performance the occasion of a special report to Washington, which may be expected in the near future to have a large influence upon the subject of army haulage.

Much Motor Progress in Baltimore

Police officials of Baltimore believe in modern methods when it comes down to the use of vehicles for the various hauling purposes in the department. This fact was demonstrated the early part of this month when the last of the eight police stations was furnished with a Locomobile patrol wagon in place of the horse-drawn vehicle. Thus the horse is a thing of the past in this locality in so far as the hauling of prisoners to the stationhouses or jail is concerned as well as the transportation of injured or sick persons to the hospitals or their homes.

The police department of Baltimore now has in service eight Locomobile patrols, while the board of Police Commissioners have also furnished Thomas Farnan, marshal of police, with a machine of the same make for his official duties. This is used also by Deputy Marshal Manning for inspection work, while when any of the commissioners have any official duties to perform the machine comes in handy.

The motor police patrol wagons have proven greatly superior to the horse-drawn vehicles, for they can get to the patrol boxes quicker and to the far away suburban calls in much quicker time. They are also much more valuable for hospital purposes and already many lives saved have been attributed to the quick service of the motor machines in getting injured or ill persons to the hospitals in such short time as to make it possible for them to get prompt medical attention.

The introduction of these motor patrol wagons into the local service has also saved the department a large amount of money by replacing, in addition to the horse-drawn patrol wagons and horses, the several Black Marias or jail vans in which prisoners were heretofore conveyed from the police stations to jail after having been sentenced in the police courts or to be held on more serious charges until their cases come up for trial in the higher courts.

So pleased are the police officials with the modern motor vehicles and so much confidence have they in the durability and certainty of these machines that the commissioners have decided to dispose of the horses heretofore used for drawing the patrols and jail vans, as well as the old style vehicles themselves, at public auction sales.

The Locomobiles used by the department are four-cylinder machines with 148-inch wheelbases. Thus these machines are from 14 to 17 feet long, the latest ones

WHITE AMBULANCE ON DUTY AT SEVENTH REGIMENT SUMMER CAMP NEAR PEEKSKILL, N. Y., WHERE IT WAS INVALUABLE being slightly smaller in size than the first ones placed in service. In tests of these machines they have averaged 60 miles an hour on level space, while they have pulled many of the high hills which abound in and around the city at a speed of 40 miles an hour. Callahan, Atkinson & Company are the local representatives for the Locomobile and it was through them that the police department purchased the machines. The cars cost $5,500 each.

The latest municipal department to be equipped with a motor for inspection purposes is the street cleaning. Commissioner Larkins, head of this division, looks after his inspection work in a Cadillac car which the city purchased from the local agency, the Standard Motor Car Company.

Exclusive Motor Fire Station at Revere

The town of Revere, Mass., a suburb of Boston, is to erect the first fire station thereabouts exclusively for motor apparatus. It is to be a three-door building and will cost $26,000, this sum having been appropriated a few days ago at a town meeting. The new station will be the central and will be on Broadway. Work is to start at once.

The question of building a new central fire structure in Revere has been under consideration for over a year, and a committee which had the matter in charge secured plans for a station to cost $33,000. Recent investigation developed the fact that it costs about $300 a year to keep a horse in the fire department, whereas the maintenance of the automobile chemical wagon in the Revere Beach section of the town costs only $150 a year. At the central station there are five horses, costing $1500 a year to keep. It was figured quickly that there would be a saving of $1200 a year by installing two pieces of motor apparatus.

When this great saving in annual expense was made clear the committee consulted the architects of the building and discovered that by eliminating accommodations for horses the cost of the building could be reduced $7000. These savings actuated the committee in recommending a motor equipped station and the recommendation was accepted.

The fire department intends to motorize the hook and ladder truck and to put in an automobile chemical. The new station will have a floor 50 by 80 feet. The building will be of brick, with terra cotta trimmings, and will have a tower containing reading room for firemen and chief's quarters. There are to be 10 sleeping rooms and a large recreation room. The space back of the main floor, which would have been used for a stable, is available for a battery and signal service room and workshop.

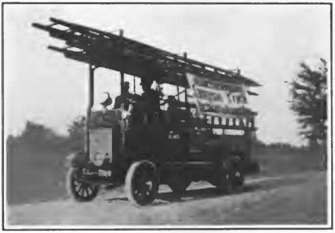
Large Combination Ladder for Alliance

One of the most progressive small municipalities of the country, at least in the matter of changing to motor driven fire apparatus, is Alliance, Ohio. The chief of this department is A. O. Aungst, who at the recent fire engineers' convention in Milwaukee made the strongest plea for the efficiency and economy of the motor. Moreover, he gave actual cost figures from his city to prove the statements made.

Shortly after this gathering the Alden Sampson Mfg. Co., Detroit, delivered his latest order, the combination ladder and hose wagon shown in the accompanying photograph. This was so large that it had to be driven overland from the city where it was made to the Ohio town. The back portion of the vehicle was along standard lines, but a large extension ladder was carried by a superstructure carried up at both front and rear. Owing to the necessity for men standing beneath it this had to go up at least seven feet, giving the truck the peculiarly high and narrow appearance which the picture brings out.

Heavy Trucks in Army Maneuvers

At the annual war game held in Massachusetts last summer a fleet of White trucks played a prominent part. Much criticism and opposition has been encountered in the past year or two to the introduction of the automobile and commercial vehicle as a means of saving time and otherwise improving the efficiency of the army. This time, however, the cars were welcomed with open arms and given a fair show. Under such circumstances it is not strange that they made an excellent record and astonished the officials with their various performances. In the illustration on the next page a pair of the White three-ton trucks are shown carrying heavy loads of camp equipment, bedding and utensils. In this work they replace about 25 horses or mules and decreased the work of loading and unloading.



SAMPSON COMBINATION LADDER AND HOSE WAGON FOR ALLIANCE, O.

From present indications, following this and subsequent demonstrations, the army mule now seems doomed to be superseded at an early date by the commercial car.

Wilmington's Ambulance Service.

Wilmington now has an automobile ambulance service, the first in the State of Delaware, a fine new machine, the joint product of the Mitchell Motor Company and the Bowe Carriage Company, the latter of this city, having been placed in service by the Phoenix Fire Company, No. 4. The Bowe concern built the body and fitted the car after the most approved design. It is equipped for the best service. The engines are of 60 horse-power. The ambulance is sufficiently large to carry two stretchers at a time, when necessary. The company has two horse-drawn ambulances, one of which will be dispensed with, while the other will be kept and used when needed.

In Wilmington there are 12 fire companies, which do service under annual contracts with the city. The Phoenix company has maintained for several years an ambulance service as a special feature, for which it is paid by the city, in addition to the compensation it receives for fire work. Its engine house is located more centrally than any other, which gives it an advantageous position for an ambulance service. As there is only one general ambulance, however, many of the runs are very long, and the automobile will be a time saver on all such runs, while there will be an economy, in view of the fact that some sections are very hilly.

IN THE MASSACHUSETTS ARMY MANEUVERS, WHITE TRUCKS HANDLING BAGGAGE

The Fame Fire Company, No. 6, which is also under contract with the city, has decided to purchase a La France combination chemical engine and hose wagon, which will replace a horse-drawn vehicle. The company has had the matter under consideration for some time, but could not make up its mind what sort of a machine it should have. Its quarters are in the lower part of the city, from which nearly every run means a hill, and a motor car will be a big improvement.

Braddock Fire Wagon a Packard Departure

In constructing the combination hose and ladder wagon shown in the illustration herewith the Packard Motor Car Company, Detroit, made somewhat of a departure. In the past this company has constructed all manner of patrols, ambulances and chief's runabouts on standard touring car and runabout chassis, but the one shown is the first purely fire apparatus applied to a truck chassis.

COMBINATION CHEMICAL AND LADDER WAGON ON PACKARD CHASSIS

It is for the town of North Braddock, Pa., which is an aristocratic suburb of Pittsburgh, and consequently wanted the best to be had. A regular three-ton Packard truck chassis was fitted with the ladders, hose compartments and other necessities, the whole being finished in a fine manner so as to present an excellent appearance.

Three-Wheeled Tractor Has Wide Field

One of the biggest problems of the industry to-day is to take care, in some manner not yet decided, of the large number of perfectly good wagons and similar vehicles now horse drawn and owned by firms desirous of making the change but unable to discard this equipment on account of its large value. A recent invention seems destined to fit into this niche nicely, this being the three-wheeled tractor constructed under the Martin patents by the Knox Automobile Company, Springfield, Mass.

As may be seen in the one shown herewith this consists of a power plant and transmission mechanism complete mounted on a vehicle which has a single leading wheel and a pair of rear drivers. Upon the rear end of this a platform affords a means of mounting the fifth wheel of the usual horse drawn wagon, so that the tractor is slipped into the place of front wheels and horses. In the one pictured this has been applied to a very old hook and ladder, secured from a Connecticut city for demonstration purposes. These are used so little that they wear out very slowly, this particular example being 50 years old. All of the cities of the country have one or more of these which they cannot discard because they are worth so much money, but the new Knox-Martin tractor seems to afford a way out of the dilemma, motorizing the department without scrapping anything but the horses.

In the official tests of the combination speeds as high as 35 miles an hour were made despite the heavy weight. Hill climbing ability was displayed to the satisfaction of the fire officials present at the test, and in other ways the new device proved its utility.

Miscellaneous Notes from Here and There

Bay City, Mich., has received and tried out the automobile for its fire chief, as well as the new fire truck, with chemical tanks and hose.

Motor mail service has been tried in Atlanta, Ga., for collecting from post boxes in the residential district. The time required was reduced to one-third.

Both San Francisco and Chicago have advertised for bids on several extra pieces, the former for a number of chiefs' automobiles and the latter on a second-class pump.

Newville, Pa., has tested out two chemical fire engines with a view to purchasing one. The city council has appropriated a sum of money towards this, as has also the civic club.

Saginaw, Mich., has a new fire engine, which proved its worth on the first day of actual service by beating all horse-drawn apparatus to a fire by several minutes, despite a late start.

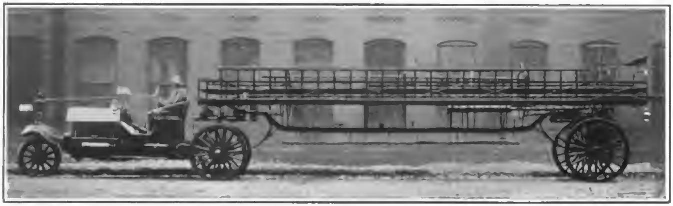
The city of Thompsonville, Ct., has received the new automobile truck, which is a combination chemical and hose wagon. This is the second vehicle of this nature purchased by the city.

Muncie, Ind., has postponed the purchase of motor apparatus until such time as more money is available. Newcastle, nearby, is considering the purchase of a machine, type and size not announced.

Upon recommendation of the special fire committee of Washington, Pa., the council has purchased a Knox combination chemical hose wagon for $5,300. To house it the fire quarters will be widened out and another story added.

Preparatory for appropriations and bids on motor fire apparatus the City Council of Taunton, Mass., has asked Chief Leonard of the Fire Department to outline his needs and submit specifications of vehicles which would fill them.

Due to the present high tax rate, the council of Phillipsburg, N. J., has decided to postpone the purchase of automobile apparatus for another year. This city is so hilly it is admitted by all concerned that the motors will show much better results than horses.



THREE-WHEELED KNOX-MARTIN TRACTOR HAULING OLD HOOK AND LADDER WAGON, A NEW DEPARTURE WHICH PROMISES MUCH

A combination patrol and ambulance has been advertised for by Peoria, Ill., bids closing December fifth. The specifications called for a minimum wheelbase of 140 inches, a motor of at least 4.75-inch bore by five-inch stroke, developing not less than 45 horsepower.

The Board of Public Works of Lafayette, Ind., met recently to receive bids on a combination motor hose and chemical wagon, for the purchase of which $6,000 has been appropriated. A sum of $3,000 has already been set aside for a combination ambulance and patrol wagon.

Weehawken, N. J., just across the river from New York City, has decided to follow the latter's example and purchase motors. At the last meeting of the township officers, a special committee reported on the advisability of buying a Knox machine, but final action was deferred.

According to his official report, Fire Chief William Toomey, of Chattanooga, Tenn., shows that the big auto engine has saved the city $148 for the 10 months it has been in use, in addition to eliminating one man. The salary of the latter would be $900, hence the city is better off at the rate of $1,070 a year.

At the Mack shops in Allentown, Pa., four pieces of apparatus are building for Morristown, N. J., Cynwyd, Pa., one each, and two for Baltimore, Md. These have aroused much local interest, and at all times numbers of firemen may be found in, or on their way to, the factory in the valley for the purpose of getting acquainted with the newest fire fighting equipment.

Engine 16 at Main street and Woodlawn avenue, Buffalo, N. Y., has been replaced by a Webb motor fire engine. In the official tests this delivered two streams each of 666 gallons a minute for over an hour, and ran through about a mile of the city's residence section at the rate of 58 miles an hour. The commissioner is asking for sufficient funds to purchase another machine, a combination chemical and hose wagon for the Cleveland avenue station.

In the report of the committee on fire prevention, appointed by the mayor of Boston, Mass., last summer, it is recommended that the force be redistributed and that motor apparatus be installed gradually to replace all horses. Concerning new motor apparatus, the commission advises the immediate purchase of 10 combination chemicals, six hose wagons, one aerial ladder truck, three ladder trucks, seven autos for district chiefs, two autos for the fire alarm branch, one for the repair shop, one motor tractor for the steam fire engine and one power boat for the marine district chief.

"I believe it the best investment Bloomington ever made," is the comment of Mayor Moore on the city's automobile fire truck. This piece is a combination chemical and hose wagon from the shops of the Seagrave Company, Columbus, O., and carries two sets of extension ladders, a chemical tank, 1,000 feet of hose, crowbars, axes, wire cutters, extinguishers, reel of small hose for chemicals, and other paraphernalia, in addition to seven men. In the official test the well-known Fell avenue hill was surmounted at the rate of 35 miles an hour, carrying full equipment and twelve men.

Commenting on recent acquisitions of that municipality, the Bay City, Mich., *Tribune* says editorially:

> No complaints have been filed as to the action of the Common Council in providing the police department with an auto patrol, and provision for at least one or two auto fire engines would be a move in the right direction. These modern utilities are so progressive and business-like that the marvel is such service has been so long delayed. The need for such things grows out of the effort to promote the general public welfare. In both the police and fire departments time is the essence of the situation when there is trouble on hand. The automobile so nearly annihilates time that its value to these departments, and therefore to the public which they serve, cannot be overestimated.

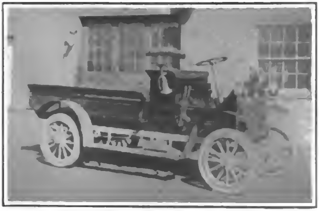
Experiences with Brewery Trucks in Pittsburgh

THE Independent Brewing Company, of Pittsburgh, has been carrying on a series of very exhaustive tests of motor trucks. The idea of its officials was to substitute trucks for horse deliveries just as rapidly as machines could be found which would be satisfactory. The first purchases were made last year for the Duquesne brewery on the South Side. Two trucks were tried out thoroughly there but the officials assert that they did not give general satisfaction.

In June, 1910, the Independent Brewing Company bought three trucks of different makes in order to determine more accurately the specific worth of each one for their particular uses. At the Chartiers Valley Brewing Company plant at Carnegie, Pa., a 20-horsepower White gasoline motor truck was installed. This has given splendid satisfaction. William Boardman, superintendent of the Chartiers Valley plant, reports that the only repairs necessary were caused by one tire slipping off twice and the brake not being properly set at first. The builder's representative soon remedied this latter trouble and the truck has been running steadily since then. It consumes an average of from five to six gallons of gasoline a day and makes a total of 50 miles a day on long runs and from 35 to 40 miles a day on short trips. Two men go with the truck. One is the driver and one is regular delivery man. According to Manager Boardman, it has stood all the tests of the very steep hills in the Chartiers Valley district. Mr. Boardman believes that for their locality, however, a 40-horsepower truck would be more suitable, but says that the 20-horsepower truck on ordinary levels and grades will pay splendidly. At their plant the White truck is now doing the work formerly done by two teams and if the hauls were all long ones Mr. Boardman says it would easily do the work of three or four teams.

The Independent Brewing Company placed other trial trucks at New Kensington, Pa., where the Studebaker was bought; Bennett, Pa., where a Packard was installed; South Side, Pittsburg, where two Gramm-Logan trucks were put on trial, and Millvale, Pa., where the Garford truck was chosen to stand the test at the American brewery. Detailed reports about these trucks have been sent to the company's headquarters in the Farmers' Bank building every month about the use, wear and tear and cost of maintenance of these machines. The Studebaker and Packard trucks have stood the test well. It is likely that more machines will be purchased within the next few months, and this is also the case with the brewery at Braddock, Pa. The big Garford truck at Millvale, Pa., had some of the hardest routes in Allegheny county to traverse and is making an exceptionally good record.

The result of the company's experiments is summed up by Manager Steinert of the Duquesne brewing plant on the South Side as follows: "Our heavy trucks have made possible a large amount of business which we could not otherwise have had. For instance, we are now able to make the run to Duquesne, Pa., in one and a quarter hours with the Gramm-Logan truck. If we had to make the same trip with a team it would take at least four hours and you can imagine what the condition of beer would be when it was hauled in that time without ice in the hot weather.



NEW P. H. P. DELIVERY WAGON FROM WESTFIELD, MASS., A 24-HORSEPOWER UNIT

THE P. H. P. DELIVERY WAGONS

Light delivery wagons of 1000 pounds capacity are built by the P. H. P. Motor Truck Company, of Westfield, Mass. The motive power is supplied by a four-cylinder vertical motor of 24-horsepower with selective type of change speed gear, giving three speeds forward and reverse, and propeller shaft drive to a rear axle of the full floating type.

The body is seven feet long and 42 inches wide, having a wheelbase of 100 inches. The tread of the wheels is 56 inches. The body is carried upon semi-elliptic springs in front and elliptic rear.

The car throughout is of sturdy construction, the front and rear axles being drop forgings designed to withstand heavy usage. It will average 20 miles per hour without trouble and is easy to operate by means of the spark and throttle levers on the steering wheel.

The standard equipment furnished with the car includes a full outfit of lamps, jack, tire pump, horn and repair outfit.

The motor truck cannot be sold entirely on a comparison with horses, for the saving of time and the general services must be taken into consideration. Although economy is important the truck must be judged solely by the results it offers. Such a result is supplied in Jackson County in Missouri, which recently bought four Sampson five-ton heavy duty trucks and has been able to lay roads at a cost far less than would have been possible with horse-drawn vehicles. The Jackson County people made from one to four miles of road a day. The trucks were used for carrying stone and material. In some cases a truck covered 30 miles from the base of supplies. On an average a truck carried 36 tons of stone over a five-mile trip. To do the same work under the old plan would require nine wagons, 25 horses and nine drivers.—Benjamin Briscoe.

Commercial Motor Vehicle Patents

Truck Wheel for Soft Ground

On soft ground, turf or in marshes or swamps it is impossible almost for a truck to gain traction, so that there is a large demand for a wheel which will enable the vehicle to be used under such circumstances, yet be of such a nature that it can be used also on public highways. In the invention shown herewith this is possible, an ordinary steel tread having a series of eight tongues which may be thrown out so as to project. In addition the openings into which they fit give a grip on the soft ground, which would not necessitate their extrusion. Patent 1,009,062 granted to F. A. Fromman, St. Louis, Nov. 21.

Improvements in Inspection Cars

The Sheffield inspection car for railroad use, erroneously marked Donner Chain Tightener in the cut below, has been on the market a long time, and has seen wide adoption and a number of years of successful use. The latest features adopted for this include an air-cooled engine, which drives the road wheels directly. This and other new devices are covered in a combination patent, 1,009,519, issued Nov. 21 to W. S. Hovey and C. B. Stebbins, Three Rivers, Mich., and by them assigned to the Sheffield Car Company of that town.

Internal Electric Wheel Drive

Coincident with the great increase in electric cars and their use for cities, a large number of inventors have commenced work upon details of that type of car. The one illustrated shows an internal electric drive, a motor at the center of the wheel, both laterally and radially, being furnished with current by means of wires leading in from the battery or generator. This drives two shafts revolving in different directions, each one of which carries a pinion at the outer end, this meshing with a gear or rack fixed on the wheel. Thus motion is imparted to the latter at two diametrically opposite points.

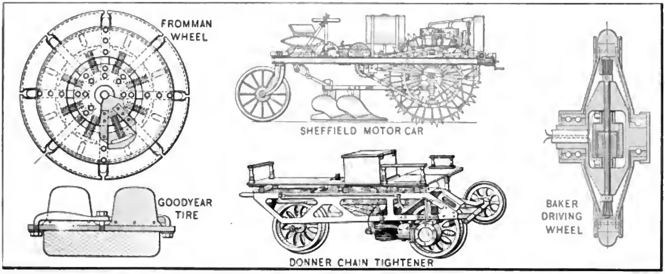
Latest Non-Skid Truck Tire

Skidding is now and has been one of the largest problems of the commercial vehicle industry, and overcoming it has induced many clever ideas. Similarly, the detaching of individual parts of the tire to replace wear in spots has evolved some new constructions. The latest Goodyear patent covers a new form which promises much along both lines, although it appears to have been designed as a sectional demountable tire. The tread is in blocks and each one has an individual grip holding it in place.

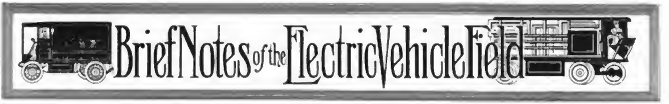
Chain Tightener for Tractors

In the operation of a large, heavy tractor for a long period of time, it has been found that there is a tendency for the chains to stretch, due to several causes. Ordinarily, taking this up has been a hard task, but the invention of Donner pictured on this page is intended to simplify the same. This provides a radius rod between driving sprocket and rear wheel, which has a triangular structure and is pivoted at a low point while the front end is raised. At the forward extremity a crank is placed to turn a cross shaft, the end of which carries a wheel meshing with a rack on the previously mentioned triangular radius rod. According to the direction in which the handle is turned this is raised or lowered, the former shortening and the latter lengthening the center to center distance. The drawing, wrongly marked Sheffield Motor Car, brings out this construction.

From Philadelphia comes the story of the ingenious driver of an electric truck, who managed to keep cool during the Summer by placing an electric fan on the seat beside him, feeding it from the truck's batteries.



THE NEWEST AND MOST USEFUL IDEAS OF INVENTORS ALONG COMMERCIAL VEHICLE LINES



Brief Notes of the Electric Vehicle Field

Electric Vehicles at the National Shows

Eighteen different makes of electric vehicles will be exhibited at the New York and Chicago automobile shows this winter. Eight of these will be displayed at the Madison Square Garden display from Jan. 6 to 20, six others at the Grand Central Palace show from Jan. 10 to 17, and thirteen makes at the Chicago exhibition in the Coliseum and First Regiment Armory from Jan. 27 to Feb. 15.

There will be no duplication of exhibits in the two New York shows, which will be open concurrently, but many of the makers who exhibit in these will make displays also in Chicago. Four of the electric car companies will exhibit passenger cars during the first week, and commercials second week, both in New York and Chicago.

GENERAL VEHICLE ELECTRIC IN SERVICE OF PEOPLE'S LIGHT COMPANY

The appended list shows where each company will exhibit its product and the class of vehicles that will be displayed. Several makes that are new to the public will be seen this year. These are the Argo passenger and commercial cars, the Bronx commercial vehicles, the Flanders electric passenger cars, the General Motors electric trucks, the Standard electric passenger cars, and the Ward Delivery wagons.

Anderson Electric Car Company, Detroit.—Passenger and commercial cars, Madison Square and Chicago.

Argo Electric Vehicle Company, Saginaw, Mich.—Passenger and commercial cars, Grand Central.

Baker Motor Vehicle Company, Cleveland.—Passengers and commercial cars, Madison Square and Chicago.

Broc Electric Car Company, Toledo, Ohio.—Passenger cars, Chicago.

Bronx Electric Vehicle Company, New York City.—Commercial cars, Madison Square.

Columbus Buggy Company, Columbus, Ohio.—Passenger cars, Grand Central and Chicago.

Flanders Manufacturing Company, Pontiac, Mich.—Passenger cars, Madison Square and Chicago.

General Motors Truck Company, Detroit.—Commercial cars, Madison Square and Chicago.

General Vehicle Company, New York City.—Commercial cars, Madison Square and Chicago.

Hupp Corp., Detroit.—Passenger cars, Grand Central and Chicago.

Ohio Electric Car Company, Toledo, Ohio.—Passenger cars, Grand Central and Chicago.

Rauch & Lang Carriage Company, Cleveland.—Passenger cars, Chicago.

Standard Electric Car Company, Jackson, Mich.—Passenger cars, Grand Central and Chicago.

Studebaker Automobile Company, South Bend, Ind.—Commercial cars, Madison Square.

Walker Vehicle Company, Chicago.—Commercial cars, Grand Central and Chicago.

Ward Motor Vehicle Company, New York City.—Commercial cars, Madison Square.

The Waverley Company, Indianapolis.—Passenger and commercial cars, Madison Square and Chicago.

Woods Motor Vehicle Company, Chicago.—Passenger cars, Chicago.

Department Stores Adopt Electrics

One of the largest department stores in the Middle West, Crowley, Milner & Company, Detroit, Mich., and Toledo, O., have just placed an order with the Anderson Electric Car Company of the former city for five electric delivery wagons. Of these, three are to be of 1,000 pounds carrying capacity and special delivery bodies. The other two will have furnture bodies with a clear carrying space 13 feet long by six wide. They will be of the 3,000-pound size.

This order was placed, it is said, after a very careful and thorough investigation of the capabilities and possible service from the various makes and types of commercial vehicle. The decision to adopt the Detroit Electric was made after it had demonstrated its ability on long trying runs to Grosse Point, Wayne and other suburbs varying from 12 to 15 miles distant from the store, which is in the heart of the city.

The Latest Cushion Tire for Electrics

The Firestone special electric tire with which all electric owners are familiar has recently been improved in its easy-riding qualities. This has been accomplished firstly by giving it a double or dual tread and, secondly, by adding internal cavities at frequent intervals in the base, directly under the tread where the full cushion effect may be secured. The dual tread was introduced in motor truck tires by the Firestone company five years ago and immediately came into general use. It acts not only as a cushion, but also as a partial skid preventer. By placing the cavities wholly within the tire an exceedingly neat and attractive appearance is secured. No change has been made in the quality of rubber, as this has been found by years of experience to give the utmost easy-riding quality and at the same time consume the least current. To obviate creeping and ensure a firm fastening on the wheel at all times the famous side-wire method of attachment is used. This is in general use on heavy commercial cars, hence its safety on electric pleasure vehicles is beyond all question. Punctures, blow-outs and similar troubles are impossible with these tires. This tire is known in the Firestone line as the Side-Wire Cushion Electric, and although it has been in constant use going on two years only recently has it been advertised.

Large Order Placed by Express Company

Marking the beginning of a definite policy to supplant all horses with motor trucks, following its previous good experience with the latter, the American Express Company has recently placed an order with the Baker Motor Vehicle Company, Cleveland, for 50 electric vehicles in varying sizes. The choice of power is significant, as this organization previously has used a large number of gasoline cars of different makes. The Baker company says that this is but another example of the slow but sure recognition of the superiority of electric motors with their continuous torque and ability to stand the strains of frequent starting and stopping.

Price Reduction Interests Brewers

At the International Congress of Brewers, assembled in Chicago recently, much interest was aroused in the electric vehicle situation by the special quotations which were made by the General Motors Truck Company on keg trucks of three- and five-tons capacity. This concern, by means of quantity production combined with a low selling cost, is able, so it is said, to sell quality vehicles at reasonable prices. The difference of approximately 20 per cent. brought many inquiries.

Silent Shaft Drive on New Car

The latest addition to the ranks of electric commercial car makers is the Argo Electric Vehicle Company, Saginaw, Mich., with two types of 1000 and 2000 pounds capacity respectively. The feature of these is a shaft drive using herringbone gears for the final reduction, which results, so the company claims, in high efficiency, compactness and absolute silence on all speeds. The smaller vehicle, known as Type 10, is described as having a wheelbase of 86 inches, tread of 54 inches, 34 by three-inch wheels equipped with solid rubber tires, a loading space which measures 90 by 42, and battery equipment of 28 cells, 11 plates M V, Exide being standard but Ironclad Exide or Edison furnished as an extra.

Vehicle Motor Used for Power

An interesting item, bearing upon the longevity and efficiency of electric vehicle motors comes from the Indianapolis, Ind., factory of the Waverley Company, where an old motor recently was discovered in the basement driving an oil pump. Upon investigation, this was found to have been there for five years, being originally a discarded carriage motor. At this time it is doing as good work as ever, despite the fact that it is placed on a foundation four feet below the floor of the engine room, surrounded by steam pipes and in a position to receive much of the dirt and grime. In spite of these handicaps, it has never needed any repairs and has run continually for more than five years.

United States Government Buys More Electrics

One of the largest and most consistent users of electric commercial vehicles is the United States Government, which has put the majority of its purchases into service in connection with the manifold printing and library activities in Washington. In addition to the large number of these now in use, some of which have been doing the people's work for three or more years, the printing officials have added six more to their fleet.

Like nearly all of the present vehicles, these are Bakers, made by the Baker Motor Vehicle Company, Cleveland. The last order was for two delivery wagons, two light trucks and two heavy cars of 5,000 pounds capacity. The illustration shows these lined up in front of the Capitol.

THE LAST SIX ELECTRIC CARS ADDED TO THE FLEET OF THE GOVERNMENT PRINTING OFFICE, WASHINGTON. ALL BAKERS

How the Edison Battery Came Into Existence

SOME very interesting information about the origin and development of the Edison nickel-iron storage battery was given recently by Frank L. Dyer in a lecture before the New York Electrical Society. About the year 1899 Mr. Edison concluded that the experiments he had been conducting in connection with the milling of iron ore would have to be discontinued, said Mr. Dyer, notwithstanding the years of patient and persistent effort that had been expended on that work at a cost of several million dollars. He had reached the goal he sought: he had actually produced briquettes of pulverized iron suitable for reduction in blast furnaces at a price per ton actually below that which he had sought to attain, but nature had outstripped him, and the discovery of the Mesaba iron deposits in Minnesota, with cheap lake transportation, removed any possibility of successful competition. He therefore turned to other fields and devoted his energies during the succeeding years in two widely different directions. With one of these—the production of Portland cement—we shall not concern ourselves here, except to note in passing that much of the experience that had been obtained so dearly in connection with ore-milling was put to practical use. The other field to which he devoted his thought was the production of the storage battery bearing his name and which now—after almost three years of commercial use in its present form—is an accepted electrical appliance.

PETTER ENGLISH TRACTOR WHICH BURNS KEROSENE FUEL

In the making of a new storage battery he had constantly before him the idea of a cell in which lead should not be used, owing largely to its weight and inherent mechanical weakness. He therefore adopted as a starting point the use of an alkali electrolyte, with which it became possible to employ such light and mechanically strong metals as nickel and steel. At an early period in the experiments oxides of nickel and of iron were selected as the active materials for the positive and negative electrodes, but many thousands of experiments were necessary before these materials were brought into a condition of sufficient electrolytic activity. Being poor conductors, it became necessary to mix conducting substances with the active materials, and at first flake graphite was used for this purpose on both poles. This material, however, developed troubles of various sorts, and eventually mercury was used to secure conductivity in the iron electrode and flake nickel was used for the same purpose in connection with the nickel electrode.

As early as 1902-3 the battery was considered to be in a commercially developed state and many thousand cells were put on the market, but difficulties developed in the nickel mass, due principally to swelling of the nickel hydrate and slow oxidation of the graphite, which reduced the capacity of the cell, and Mr. Edison thereupon determined to discontinue its manufacture until these troubles could be eliminated. The problem, therefore, was to confine the nickel mass in perforated containers in such a way that any tendency to swell would be overcome and a proper substitute for graphite be secured. During the succeeding five years many thousand experiments were made, costing upward of two million dollars, practically limited to the improvement of the positive electrode, and resulting in the production of the present type of tubular pocket containing alternate layers of nickel-hydrate and flake nickel maintained under great pressure, the pockets being made of nickel-plated steel wound with a spiral interlocking seam and bound by steel rings, so as to be strong enough to resist any tendency of the contained mass to swell. The resulting battery is an absolutely mechanical, light and strong electrical generator.

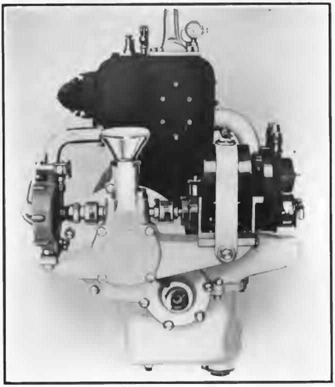
TRACTOR WITH KEROSENE MOTOR

An interesting type of kerosene oil tractor for agricultural and general haulage purposes is being marketed by Petter's, Ltd., of Nautilus Works, Yeovil, England. The power plant in this vehicle consists of a specially designed two-cylinder horizontal Petter unit of 30 brake horse power, mounted on a steel channel frame. Laminated steel springs are provided for both front and rear axles. Wheels and the like, such as differential gear, are the same as fitted on ordinary steam traction engines. A point, however, in the Petter transmission is that there is one intermediate shaft, the transmission gearing from the engine shaft, which operates through a friction clutch, consists of machine-cut cast steel gear wheels. There are two speeds forward, 2.5 and five m.p.h., and one reverse ratio of 2.5. All these speeds, together with the clutch, are easily operated from the driver's seat. The final transmission from the intermediate shaft is by 2.75-inch Renold roller chain. On the fore carriage will be seen the unique radiator consisting of spiral filled tubes. This is assisted in cooling by a flat-bladed fan which revolves inside it. The fuel for the engine is carried under the driver's seat, and as shown the machine is sold as suitable for handling eight to 10 tons on fair roads, the consumption being about 1.5 to two gallons per hour. A winding drum is fitted on the rear axle and a self-starter of the pressure cylinder type is carried on the platform so as to allow the machine to be managed and started, if necessary, by one man.

The Newest Vehicles and Accessories

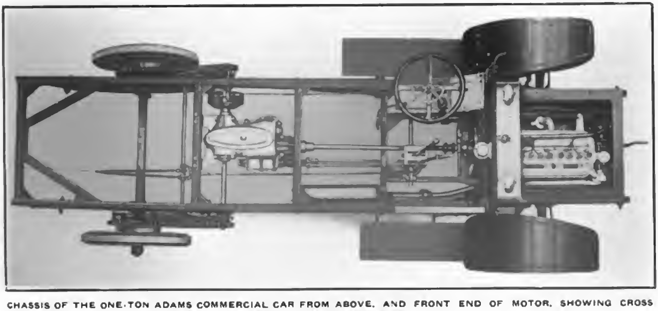
Details of the Adams One-Ton Truck Which Possesses Many Valuable and Different Features—The New Jones Recording Device for Commercial Cars

AMONG the latest permanent additions to the list of makers of medium sized commercial cars is the Adams Brothers Company, Findlay, O. Despite the truth of this statement, the concern has behind it 40 years of successful manufacturing experience. The firm has been prominent in the manufacture of engineering material, in the conduct of foundries and in machine practise for that length of time. Obviously, this must have resulted in a high standard of manufacture which applies to the commercial cars now being turned out. This makes its appearance in little details and refinements, many of which can only exhibit their worth after long service.

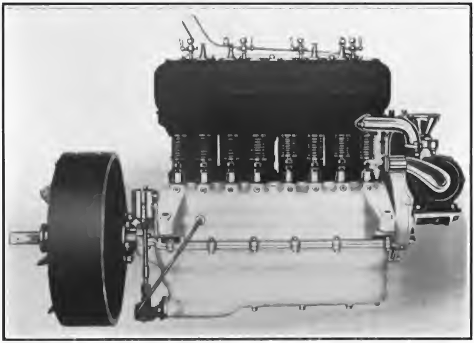


For the present, the Findlay shops will be concentrated on a single model, a one-ton truck. This is shown herewith in a chassis view from above, a side and an end view of the motor. The latter is a four-cylinder unit of 3.875-inch bore and five-inch stroke. The cylinders are cast in a block, with large and well rounded water passages for the circulation of the cooling fluid. The engine is rated at 30 horsepower. Pistons are machined and ground to size from a special grade of gray iron, as are also the rings. The crankshaft, which is of 3.5 per cent nickel steel and rough forged to size, has three bearings of large diameter and considerable length. These are of a special composition.

The valves are located on the right side, where a single camshaft with the cams forged integral operates all eight. The shaft is entirely enclosed so as to partake of lubrication from within the case, while the drive is by means of silent spiral gears. The valves are constructed from selected material, are interchangeable and of liberal diameter. Aluminum alloy forms the material of the crankcase, which is designed in two halves, the upper of which contains all the working parts. The lower acts sim-



CHASSIS OF THE ONE-TON ADAMS COMMERCIAL CAR FROM ABOVE, AND FRONT END OF MOTOR, SHOWING CROSS SHAFT FOR ACCESSORIES



RIGHT SIDE OF ADAMS ENGINE, SHOWING VALVES AND PUMP FOR WATER, ALSO LUBRICATING PUMP AND GAUGE

hand end of a cross shaft at the front end, the magneto occupying the other, while the drive and crankcase filler are at the center. The cooler has a pair of filling caps and flexible supports, so that there is little possible danger of its being damaged.

The magneto just referred to is an Eisemann of the high tension type, its distributor being used for the battery current as well, thus giving a dual system. The position of the unit at the extreme front and near one side makes it very accessible for adjustment or repair. Engine control is by means of the usual spark and throttle levers, mounted on the steering wheel. The control being placed on the left side, the gear is very close to the magneto and the Kingston carburetor which is placed on that side. This makes the control

ply as an oil reservoir. In this capacity it holds the supply from the pump, the system being a combination of the splash and force feed.

Cooling is by means of a spiral gear-driven centrifugal pump, which gives a positive circulation. The flywheel carries fan blades, while the radiator is of large size and efficient type. The latter is located back of the motor, on the dashboard in Renault style, a sloping bonnet being used to cover the engine. As the end view of the motor shows, the pump is placed on the right

rods very short and simple without bell cranks or levers.

From the motor the drive is through an expanding disc clutch to the selective transmission. The former is so constructed that it can be dropped in suddenly and the car will pick up smoothly and without jerk. The gearbox gives three forward speeds with direct on the high. As the chassis plan depicts, it is formed in a unit with the differential housing just back of the center of the car. Universal joints in the connecting shaft take up possible differences of alignment.

Jones Recorder Meritorious for Truck Use

ONE of the biggest troubles with motor truck drivers in the past has been their irresponsibility and lack of attention to details, this taking the form of a disappearance from routine with the vehicle. By using the newest device in the way of car time speed and distance recorder, this evil is so minimized as to almost eliminate it. In addition, the owner of the power wagon is given a complete and accurate record of its every movement, allowing him to make a careful and accurate estimate of the cost as a lump sum, by package and by the mile or ton-mile as desired.

Reference is had to the Jones device, invented and manufactured by Joseph W. Jones, also the inventor and maker of the well-known speedometer bearing his name. The cuts herewith show this in detail and its application. The first illustration depicts the fleet of the Ebling brew-

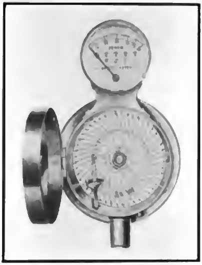
FLEET OF COMMERCIAL CARS OF VARIOUS SIZES EMPLOYED BY EBLING BREWERY, ALL FITTED WITH JONES RECORDING DEVICE ery, all of which vehicles are equipped with the device. The second figure is a duplicate of one side of a used paper record from this machine, while the upper portion of the same shows the reverse of this card with spaces for such additional information as only the driver could supply. The last cut brings out the assembled recorder with the lower door opened to show the needle tracing its graphical proof of the car's movement.

The entire instrument as shown in the latter comprises a specially constructed clock mechanism in a heavy brass case which is attached to the body of the car and a strong flexible shaft connecting with the wheel by means of gears; this cable operating a recording stylus which marks on a circular dial of specially prepared paper, this being turned by the clock mechanism.

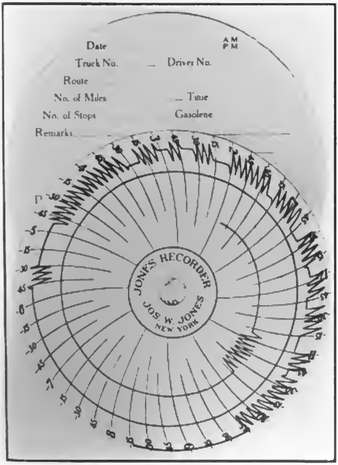
These dials are designed for daily or 36-hour records and are changed readily at the end of that period, the exact work consisting of opening the glass door at the front, lifting the pen off of the paper, loosening the central nut and removing the card. The discs are very simple and so low in price their cost is negligible.

The record disc shows the time at which the vehicle leaves the garage, number of stops made during the day, the duration of each stop, mileage covered between stops and time the vehicle returns to garage; also the speed at any time during the day can be ascertained. This information is invaluable to owners of motor wagons; a perfect check on the delivery expense and also showing efficiency of both the vehicle and driver.

To return to the second figure, this shows a record disc taken from the recorder on one of the trucks of the Ebling Brewing Company, showing a day's operation. The disc is divided into 12 hours, representing one-half day, and revolves twice for the 24 hours. The cross lines show the car movement, each line indicating one-half mile of travel while the circular line shows the duration of the stop, the time the vehicle is stationary.



THE JONES RECORDER AND CLOCK COMBINED



FRONT AND BACK (ABOVE) OF PAPER DISC FROM JONES INSTRUMENT

The record here illustrated shows that the chart was put on at 8:15 and vehicle operation was as follows:

Truck ran from	Truck ran from
9:45 to 10:37—9½ miles	1:20 to 2:00—7¼ miles
10:45 " 11:00—3 "	2:15 " 2:35—3 "
11:15 " 11:37—4 "	2:45 " 2:55—2 "
11:45 " 12:05—2¼ "	3:05 " 3:22—3½ "
12:15 " 12:35—4¼ "	3:33 " 4:50—14½ "
12:47 " 1:15—5 "	5:30 " 5:45—3¼ "

Twelve stops.

Truck out of service for 16½ hours and then ran again from 10:15 to 11:08—9¼ miles. Making a total run of 71¼ miles.

Average speed, 11 miles per hour.

Chart removed at 1:55.

Running time, 6 hours and 25 minutes.

That this kind of an instrument fills a long-felt want is seen in the list of prominent New York City vehicle owners, more than 40 of the largest including those with big fleets of cars from the smallest to the largest having been fitted with it. Moreover, a considerable foreign demand is indicated by the shipping orders to Hamburg, London, Japan and many other points. In the taxicab business as well, it has found a very important use. There, it is used to check both taximeter and driver, as well as preserving a more complete record of the day's work than is possible by any other means.

EXACTING TEST OF COMMER TRUCK

Interurban traffic by means of freight automobiles was given an impressive demonstration recently when a Commer truck was despatched from Brooklyn, N. Y., to Philadelphia with a full load of household goods for quick delivery. Starting at midnight, the truck arrived at its destination at 9 o'clock the next morning, was unloaded, and at 2 p. m. started on the home journey, reaching Brooklyn at 10 o'clock in the evening. Fourteen miles an hour was the average running time for the round trip, including necessary stops and slow-downs in towns and cities.

C. Langmaid, for many years manager of the Hartford Rubber Company's branch in Boston, has become connected with the Autocar Company, of Ardmore, Pa.

Of Interest to the Power Wagon Industry

With the Agents and Dealers

John T. Burke, of Ishpeming, Mich., has become agent for the Poyer Truck Company.

Wyckoff, Church & Partridge, of New York, have opened a branch in Chicago to be managed by Thomas P. Goodbody. P. W. Gillett will also be connected with this branch

The Federal Truck Company, of Chicago, has opened spacious quarters at 1716 Michigan avenue, and will market motor trucks made by the Federal Motor Company, of Detroit.

The Goodyear Tire & Rubber Company, Akron, O., has arranged for a lease of a two-story reinforced concrete building about to be erected on W. Van Ness avenue, San Francisco.

The Motz Tire & Rubber Company, Akron, O., has opened a branch in the metropolis at Broadway and Fifty-sixth street. E. P. White, formerly connected with the Goodyear concern, will be in charge.

The Dayton Motor Truck Company, of Dayton, O., which manufactures the Durable Dayton truck, has opened temporary office in the New York Life building, and a service department and garage at 1407 Michigan avenue. The Chicago branch is in charge of Morgan E. Ballou.

The Dart Manufacturing Company, Waterloo, Ia., has closed a contract with the La Crosse Plow Company, La Crosse, Wis., by which the latter takes the agency for the Dart motor trucks in a territory covering five states. The contract calls for the immediate delivery of 100 cars.

A new salesroom has been opened by the Veerac Sales Company at 218 Paterson street, Paterson, N. J., for the handling of the Veerac light delivery wagons. H. B. McGinley has charge of this branch of the business. The machines are of 1,500 pounds' capacity, and are very serviceable for parcel delivery work.

The Stoddard-Dayton Company of Delaware has merged with the United Motors Company, which has its headquarters at 216 North Broad street, Philadelphia. The Stoddard-Dayton agency, at 1011 Orange street, Wilmington, Del., becomes a branch of the Philadelphia office. The company will handle Stoddard-Dayton, Maxwell and Columbia cars and Alden-Samson trucks.

The Automobile Dealers' Association of Pittsburgh, Inc., is moving into its new quarters on North Beatty street, East End. Its show committee has just been appointed as follows: chairman, R. C. McCurdy; other members, A. X. Phelan, G. P. Moore, F. D. Saupp, and T. F. Dunn. The 1911-12 show will be held in Duquesne Garden and the dates will be announced shortly It will continue two weeks, and it is likely that the last week will be devoted entirely to motor truck exhibits.

The New Departure Manufacturing Company, of Bristol, Conn., manufacturers of the ball-bearing of that name, has opened a Western branch in the Ford Building, Detroit, Mich. The company will maintain an engineering and sales force at this branch, which will be immediately available to the many customers in Detroit and the West. A full stock of all bearings of the company's manufacture will be carried at this branch. John R. Ide, formerly associated with the Hyatt Roller Bearing Company, will have charge of the office in Detroit.

Recent Motor Truck Incorporations

The Prudence Motor Truck Company, of Brooklyn, has filed papers of incorporation; capital, $100,000.

Papers of incorporation were filed recently with the County Clerk by the Buffalo Motor Vehicle Service Company, capitalized at $100,000.

A new West Virginia motor truck company is the Motor Transfer Co., of Clarksburg, W. Va., which has recently been chartered with a capital of $10,000. Its incorporators are: Dr. Charles N. Slater, H. B. Douglas, Edwin Florry, L. C. Hetrick and C. B. Stout of Clarksburg. The company will do a general passenger and light baggage business.

The Walter Motor Truck Company, New York City, has been incorporated to take over the commercial car manufacturing business formerly conducted by its president, W. Walter, under

KIESEL TRUCK CHASSIS WITH ENCLOSED BODY, WHICH IS BEING USED WITH SUCCESS IN PASSENGER CARRYING his own name. The same three models will be produced, namely, of the following capacities: 1.5-two, three-3.5 and five tons. A factory and garage will be built in the neighborhood of Broome street. Charles W. Fletcher is vice-president and treasurer of the new concern.

The Miles Motor Tire Spring Company, of Braddock, Pa., has been incorporated at Dover, Del., with a capital of $200,000. The incorporators are Charles W. Dressler, Thomas G. Aten, Charles L. Balyser, of Braddock; Fred Miles, Wilkinsburg, Pa., and M. R. Myers, Huntingdon, Pa. The company proposes to manufacture all kinds of motor trucks and also automobile tires. The full extent of the latter has not been entirely decided upon. Several locations for the new plant are to be started and it is likely that it will be fixed in western Pennsylvania, possibly in Braddock.

New Trade Printed Matter

The Mayo Radiator Company, of New Haven, Conn., has just issued a catalogue describing and illustrating its many types of radiators for use on motor vehicles.

The Firestone Tire & Rubber Company, Akron, O., is distributing folders on the Non-Skid tire illustrating the lettered tread. It points out the advantages of this peculiar construction and the extra thickness of rubber on the tread.

A folder entitled "Detroit" describes one of the many lubricators produced by the Detroit Lubricator Company, Detroit, operating the largest plant in the world devoted exclusively to the production of this class of devices.

The Transimeters Company, New York City, is distributing a folder entitled The Window of Mileage Truth, which is descriptive of its new hub odometer. This is made in two sizes, the larger and heavier for commercial vehicles.

The United States Tire Company has issued data sheets to fit the loose-leaf books of the Members of the Society of Automobile Engineers, containing much valuable data on the subject of sizes and detail dimensions of its solid motor tires. A request addressed ot the United States Tire Company at Broadway and 58th street, New York, will bring these data sheets in return.

FIVE-TON PEERLESS COMMERCIAL CAR LOADING IN YARD OF HYDE PARK TILE COMPANY; ITS OWNER

The Perfection Spring Company, Cleveland, is distributing a small 3.5 by six booklet, descriptive of the high-grade springs made by it. This concern will exhibit at the Madison Square and Coliseum shows only. At both, truck springs for vehicles of one to five and seven tons capacity will be displayed.

The International Acheson Graphite Company, Niagara Falls, N. Y., has published a couple of booklets descriptive of its products. Both are 3.5 by six in size, that for Oildag having the longer side vertical, while the one opening longitudinally gives a number of testimonials of the benefits from using this, Gredag and Aquadag, all graphite lubricants.

"Maximum" Silent Chain is the title of a six by nine book just issued by the Link-Belt Company, Philadelphia, makers of this accessory. The pages call attention to the manifold advantages of this method of driving camshafts and other accessory shafts on the automobile and motor truck engine. A number of these will be shown at the Garden and Chicago displays.

The United States Tire Company has just issued a booklet on motorcycle tires, manufactured by the G. & J. and Morgan & Wright branches of the company. This catalogue describes and illustrates the various kinds of treads made by these branches.

The American Locomotive Company's latest truck catalog, besides the standard two, 3.5 and five-ton vehicles, lists for the first time the new 6.5-ton model. The latter has been completed for some time, and has undergone some strenuous tests by coal concerns in the factory neighborhood, Providence, and elsewhere, but this is the first public announcement.

A booklet prepared by the engineering department of the Hyatt Roller Bearing Company has just been issued for the assistance of its sales organization. This has been prepared in the form of questions and answers, the former representing in many cases inquiries which have been received from time to time. Copy of this booklet may be had on request.

The B. F. Goodrich Company, of Akron, Ohio, is issuing a number of small folders, describing in each folder a different kind of tire trouble and a preventative. These include tires injured by chains, faulty alignment, under-inflation, neglected cuts, fabric broken, rut worn and blowout. Pneumatic tire users will find a set of these folders very valuable and a request mailed to the company will bring a quick response.

American Vanadium Facts is the name of the house organ of the Vanadium Sales Company of America, Pittsburgh. The November issue indicates the large extent to which this alloy is being used in the automobile industry, the statement being made therein that all Ford, White, Oldsmobile, K-R-I-T, and Abbott-Detroit cars will contain steel with a vanadium content. It is also a fact that many foundries all over the country are taking up this metal in a small way.

Factory Enlargements and Additions

Plans are being made to have the Hoosier Limited Motor Truck Company, of Decatur, Ind., locate in Grand Rapids, Mich., in the near future.

The Byron Motor Company, of Pueblo, Colo., has secured an option on the factory building of the old Steel Wheel and Wagon works and on January first will commence operations on an extensive scale.

Owing to the increased demand for tires of the Republic Rubber Company manufacture, the company has awarded a contract for another new building 75 by 100 feet. This building will be used entirely for the calender department and will be of the saw-tooth type of brick and re-inforced concrete construction.

At a special stockholders' meeting held recently it was voted to increase the stock of the Jacobson-Brandow Company, of Pittsfield, Mass., from $25,000 to $95,000. This company manufactures magnetos, spark coils and other ignition specialties. Branch offices have been opened at 414 Bowles building, Detroit, Mich., and at 116 Nassau street, New York.

The McCord Manufacturing Company, of Detroit, has acquired the materials, patents and good will of the Precision Appliance Company, of Chicago, and will hereafter manufacture the various well-known types of Hill-Precision lubricators and oiling devices heretofore manufactured by that company, in connection with the celebrated McCord lubricators.

A new company has been organized at Charleston, W. Va., to take over the business of the Triple State Electric Company and to manufacture motor trucks. D. F. Gunter, a well-known truck manufacturer, is associated in the new company with W. S. Roberts, of Charleston. Several other local capitalists are included in the directorate. A plant will be built at Kanawha and McFarland streets and it is expected that the first truck will be turned out before January first.

At the annual meeting of the stockholders of the Ideal Auto Company, held during October, it was voted unanimously to increase the capital stock of the company from $50,000 to $100,000. Nearly all of this was pledged at that meeting by the present stockholders. The finances and prospects of the Ideal company are in a highly satisfactory condition and the development and progress of the concern have been exceedingly pleasing to all connected with it. The company was started 2.5 years ago in a very small way and was finally incorporated for $25,000 and doubled last January to $50,000.

A fine new garage is to replace the stable of the Wilmington Steamboat Company, at the foot of Fourth street, Wilmington, Del., which was destroyed by fire recently, together with a large number of horses. After a trial of an Autocar delivery wagon for more than a year, the company recently ordered five electric trucks, which will practically replace all of the horse-drawn delivery vehicles, and the garage is to house these trucks. The contract for building it has been let to William D. Haddock & Company, local builders. It is expected to be finished by the time the trucks are ready for delivery.

CUP WON BY RELIANCE TRUCK IN SAN FRANCISCO RUN

The Continental Car & Equipment Company, of Louisville, Ky., which has had in operation for several years a plant for the manufacture of dump cars and contractors' equipment, has entered the motor truck field. It has completed the equipment of a department for this purpose, and the first machine now is being tested. It is a 7,000-pound electric vehicle, and this design will prevail in all manufactured. Machines having other load capacities, ranging from 1,000 pounds up to five tons are to be built, and the company expects to be marketing its product before the present season is over. A. B. McKinley is general manager of the company.

A. F. MAIS, NOW WITH STUDEBAKER CORPORATION

E. C. Walker, of the E. C. Walker Mfg. Company, of Louisville, is organizing a company for the manufacture of motor trucks. The company now in operation has a plant which turns out gasoline engines and does general machine shop work, but it is intended to build an entirely new plant for the truck business, which will be started in a few months. Mr. Walker hopes to turn out from 25 to 50 cars during the first season. The new machine will be of the gasoline motor type and will be built in one-, two-, and three-ton sizes. A separate company from that now in business will be organized for the purpose of building the motor trucks, and it is hoped to begin business by the first of 1912.

The United States Tire Company will occupy the new 20-story office shown in the illustration on the facing page as soon as finished. The location is Broadway and 58th street, New York. The new structure will enjoy the double distinction of being the tallest building north of Times square as well as the largest building in the metropolis connected with the motor industry. The United States Tire Company will occupy the store, with storage space beneath, while the general offices of the company, together with those of the United States Rubber Company, will be in the upper portion of the building. Each of the 20 floors contains approximately 6,300 square feet.

The Champion Spark Plug Company has purchased a 1.5-acre building site on the Lake Shore and Michigan Central Railroad tracks at Upton and Avondale avenues, Toledo, O. Work is being pushed to completion rapidly on a new and modern fireproof plant, steel frame, brick and concrete throughout. The building 102 by 72 feet, of the monitor type construction, contains every conceivable feature to assist in turning out accurate and high-class work at the lowest cost. The company has also placed an order for a large addition to its automatic machinery equipment and in its new plant will have the largest output of any spark plug factory in the world, turning out annually from 1,500,000 to 2,000,000 spark plugs with a reserve capacity of double that amount. The enormity of this proposition can be realized only by turning to the expert figures on the world's consumption of spark plugs, which is to-day at the most liberal estimate placed between 7,000,000 and 8,000,000 a year. This company is owned by the two Stranahan brothers, Robert A. and Frank D., manufacturers of the genuine Champion spark plugs.

The Lavigne Manufacturing Company, of Detroit, has been consummated in which the well known Lavigne steering gear which was formerly manufactured by the Lavigne Manufacturing Company, has been taken over into a new corporation, which will be known to the trade as the Lavigne Gear Com-

H. L. WINTER, NEW SALES MANAGER FEDERAL M. T. CO.

pany. It was found necessary to make this change on account of the increase in the steering gear business, which has outgrown the space allotted to its manufacture, in the works of the former concern. The new company has been organized with a capital of $100,000, with offices at Detroit and Milwaukee. In addition to the Detroit plant, it will operate a larger plant for the manufacture of the steering gear exclusively at Corliss, Wis., which is a suburb of Milwaukee, on the main line of the Chicago, Milwaukee and St. Paul Railroad. This new plant is 480 feet by 55 feet, and equipped with new modern tools, and will have an annual capacity of from 35,000 to 50,000 complete steering gears. Joseph P. Lavigne, the well-known inventor and designer of the steering gear, will remain with the company as its chief engineer.

Brief Personal Mention

N. K. Helmka, 727 North West avenue, who has been connected with the Buick Motor Car Company in Jackson, will leave for Detroit to take a position with the new Chevrolet Motor Company.

John H. Shield, sales manager of the H. E. Wilcox Motor Car Company, Minneapolis, has returned from an unusually successful trip through the East. During the 14 days he was away he closed sales aggregating one truck each day.

Lee W. Bennett, well known to the automobile trade through his long connection with various branches of the accessories industry, has been appointed in take charge of the automobile accessories department of the Automobile Club of America.

A. M. Welch, for about eight years with the Studebaker Company, and for the past year manager of the commercial car department of the Franklin works at Syracuse, has now taken up territorial work with the Stevens-Duryea Company, of Chicopee Falls, Mass.

H. L. Mason, Jr., was recently elected president of the Automobile Club, of Pittsburgh, to suceed Edward Kneeland, who resigned the office on account of pressure of other business. Mr. Mason will continue in office until the annual election February first.

Montgomery Hallowell, general advertising manager of the United States Motor Company, has resigned to join the forces of the H. E. Lesan advertising agency where he will assist in handling the motor company's advertising and in the work of the Lesan agency.

Theodore Huss, general manager, and George Waller, sales manager, of the Argo Electric Vehicle Company, Saginaw, Mich., are in Chicago, for the purpose of appointing an agency for Argo machines. The company manufactures electric automobiles and motor trucks.

Gridley Adams has been appointed advertising manager of the United States Motor Company, to succeed Montgomery Hallowell. Mr. Adams has held the same position with the Stoddard-Dayton division of the United States Motor Company and is well known in the advertising field.

Ralph Birchard, formerly manager of the *Railway Electrical Engineer,* Chicago, has entered the employ of the Edison Storage Battery Company, of Orange, N. J. Mr. Birchard is in the sales department located at Orange, his duties including the preparation of bulletins covering the uses of the Edison battery. The change became effective December 1.

H. L. Winter is now sales manager for the Federal Motor Truck Company, Detroit. His automobile experience dates back to the time of the curved dash Olds runabout. He later spent time with the Franklin Automobile Company in the sales department at Syracuse, was with the Thomas company at Buffalo, and later with the King Motor Car Company, Detroit.

Robert F. Russell has accepted the position of assistant engineer of the automobile department of the American Locomotive Company. Mr. Russell comes to the Alco engineering staff from the Simplex Company, where for seven years he was in charge of the designing department. He is prominent in the engineering world and is considered an authority on both motor truck and car design.

Albert F. Mais, formerly of the Mais Motor Truck Company, of Indianapolis, has joined the Studebaker Corporation in the rôle of a consulting engineer. He was formerly with the Daimler, Benz and other European factories. His designs in America have been prominent in endurance and other commercial vehicle tests, in which they have been remarkable for speed and weight carrying abilities.

H. A. Gilmartin, head of the moving picture department of the Studebaker Corporation, is back from Europe, where he installed several sets of films, depicting the methods of building Flanders 20 and E-M-F 30 cars. Mr. Gilmartin says that British motorists were amazed at the labor-saving devices in vogue at the Studebaker shops and were able to understand for the first time the causes for the difference in price between cars of equal power built on the opposite sides of the Atlantic, as shown by the pictures.

William Schimpf, president of the Long Island Automobile Club and a member of the A. A. A. Contest Board for the past year, has been appointed by President Robert P. Hooper to serve as chairman of the board for the remainder of the year, to fill the vacancy caused by the sudden death of Samuel M. Butler. The appointment followed a conference involving President Hooper of the A. A. A. and President H. E. Coffin, of the Manufacturers' Contest Association, which co-operates with the owners' organization in the conduct of automobile competition.

NEW BUILDING FOR U. S. TIRES IN NEW YORK CITY

F. R. Bump, formerly general sales manager of the Universal Motor Truck Company, Detroit, Mich., has been appointed assistant general manager of the Hupp-Yeats Company, in charge of the sale of this make of electric cars. He is a graduate of Binghamton (N. Y.) High School, a Cornell man of the class of 1896 and entered business life as assistant sales manager of the Waltham Manufacturing Company, Waltham, Mass., manufacturer of Orient bicycles. He left there to become general manager of the bicycle department of the Davis Sewing Machine Company, maker of Dayton bicycles, with whom he remained until 1904. From 1904 until 1910 he was general sales manager of the H. H. Franklin Manufacturing Company of Syracuse, maker of the Franklin car.

Miscellaneous Notes of the Manufacturers

The Reo Motor Truck Company recently received a large order for 50 trucks to be shipped at once.

The Auto Sales Company of Wilmington, Del., is experimenting in the construction of a truck of its own design.

The John Shillito Company, large wholesale and retail dry goods merchants of Cincinnati, O., have just purchased eight motor delivery vehicles, each of 2,000 pounds capacity, from the O. Armleder Company.

The sale of Packard trucks for the calendar year 1911 will be just about twice those for the preceding season. The new shops which are being whipped into shape as rapidly as possible, will treble the capacity of this division.

The Federal Rubber Manufacturing Company, Milwaukee, is the new name of the former Federal Rubber Company, which is no longer in existence. On July first the former acquired the property of the latter and all mail matter should carry the new name.

GROUP OF SALESMEN PRESENT AT RECENT CONVENTION OF BAKER ELECTRIC COMMERCIAL DEPARTMENT

The first American-built Commer truck has been sold to the Eagle Storage Warehouse, Brooklyn. This is of the 4.5-ton size and is the second Commer purchased by this firm. The first out-of-town trucks went to the Boston agent the last week in November.

A White three-ton truck owned by Heap & Heap made a splendid run from Los Angeles to San Bernardino, Cal., recently. The machine was driven by Damon Cooley and brought 4200 pounds of sheet iron for the George M. Cooley Company. The run was made in three hours and 30 minutes.

The Stetson-Barrett Company, wholesale grocers of Los Angles, Cal., has been operating a motor truck equipped with Hartford solid tires for thirteen months, and during that time 13,000 miles have been covered. The firm reports that the tires have caused absolutely no trouble, and apparently are good for six months more of hard service.

At the annual meeting of the stockholders of the Chase Motor Truck Company, Syracuse, N. Y., held November eighth, the following directors were elected: A. C. Chase, A. M. Chase, L. O. Bucklin, H. P. Bellinter and E. C. Witherby. The directors elected the following officers: President, A. M. Chase; vice-president, H. P. Bellinger, and secretary and treasurer, E. A. Kingsbury.

Goodyear tires, made by the Goodyear Tire & Rubber Company, Akron, contributed no small amount to the success of the recent transcontinental trip of the Garford party. During the 4,300 miles of travel all kinds of road and weather conditions were encountered, despite which one car went through with all of the original shoes and tubes, one of the latter containing the original air.

Polack solid rubber tires are now being made in the United States under the personal supervision of Werner Polack, son of the originator, according to the formula in use at the factory at Waltershausen, Germany. A signal acknowledgment of their superior quality and reliability is furnished by Messrs. McNamara, the English contractors, who have secured the contract to run the Royal Mails in London, England. The additional 50 vans which will be required for this record contract, will be fitted with these well known tires.

An important gathering of tire men was held at the Hotel Astor in New York recently when the United States Tire Company called together all its branch managers and salesmen in the central and eastern districts to discuss trade policies for the coming year. About 150 representatives of the company were present, among whom were J. M. Gilbert, general manager; J. D. Anderson, general sales manager; A. I. Philp, manager central district; O. S. Tweedy, manager eastern district, and William MacMahon, chairman of the factory committee.

The commercial department of the Baker Electric Vehicle Company, Cleveland, held its first annual convention at the factory recently. This was done for the double purpose of instructing the salesmen in the specific features of the Baker trucks and of strengthening the new department by an interchange of ideas. Representatives were present from New York, Boston, Chicago, Buffalo and Newark, the accompanying illustration showing the group, headed by George H. Kelly, manager of the department, in front of the office.

The Bosch Magneto Company, New York City, takes considerable pride in the success of its current generator and spark plugs in the recent Vanderbilt and Savannah races. The winner and every place car in both of these and the winner and every place car in the Grand Prize Race used the Bosch magneto and plugs as their ignition equipment. The fact that faster time was made in each race than ever was made before in a road contest of similar class and distance is evidence of the value of an intense spark ever present when required.

The COMMERCIAL VEHICLE

Vol. VII February 1912 No. 2

CHICAGO will uncover on the fifth of February the greatest commercial vehicle display the world has ever seen. This is the second week of the well-known National Association of Automobile Manufacturers' annual Windy City show, but in importance to the industrial world it will overshadow by far either the previous week or the truck showing at previous exhibitions or those to follow in the near future. This is because it is a business convention, free from frills and furbelows. The majority of the men attending will be there with an eye single to the future purchase of vehicles, whether this year or several years from now. The firms showing will be present with the sole idea of making as much impression upon the merchant and manufacturer as is possible during six days.

In comparison with last year's show, which was then the greatest gathering of motor trucks under one roof, the number of exhibitors is 82 for 1912 and 46 for 1911. From this it can be seen that almost twice as many different makes will be visible as at that time Of the increase a large number have never been seen at a commercial vehicle display before, being the product of Western makers, which has been brought forth so recently that the securing of spare at either New York show was impossible. In addition to these making their debut, as it were, a considerable list of the most reputable

INTERIOR OF THE BIG COLISEUM IN CHICAGO TAKEN PREVIOUS TO THE INSTALLATION OF EXHIBITS FOR THE NATIONAL SHOW

firms in the Middle West will display, who do not consider it worth their while to travel down to the Metropolis each year. Consequently, their product will be seen only at Chicago, which from a Middle Western standpoint, lend additional charm and attraction to the exhibit.

Interest in the commercial motor vehicle is growing rapidly, and predictions are freely made, in the trade and out, that this branch of the automobile industry will in a few years exceed in importance the pleasure car business. Largely as a result of last winter's exhibition, it is believed, the number of commercial motor vehicles in use in Chicago increased 35 per cent. in the four summer months this year. With the advance of winter weather, when ice and snow often paralyze horse traffic, and the simultaneous rise in price of hay and feed, this rate of increase is likely to become even larger. Experiences of horse owners during the excessively hot weather last July had a telling effect that is counted on by truck makers to be reflected in the interest taken by business men in the coming exhibition.

Practically all of the largest and most prominent

WABASH AVENUE COLISEUM EXTERIOR TAKEN DURING PARADE OF COMMERCIAL VEHICLES ON THE OPENING DAY LAST YEAR makers of industrial and commercial motor vehicles will have representative exhibits at the show. These will include a score of makes that are new to the public, never having been exhibited before at any of the national shows, and many entirely new models brought out by well-known companies for 1912 to adapt their lines to a wider range of requirements as to load capacity. In this list, too, the new concerns will be most prominent and will introduce a large number of distinctive ideas in their newest product.

Not all of the new makes of trucks are built by new companies, however. At least eight are just being brought out by well-known manufacturers who have been building private passenger cars for years—several for a decade or more. Among these are the Pope Manufacturing Company; Locomobile Company; Lozier Motor Company; Dorris Motor Car Company; Wyckoff, Church & Partridge; Speedwell Motor Car Company; Velie Motor Vehicle Company and Diamond T Motor Car Company.

Almost everything in the form of a self-propelled vehicle for use on the public roads will be seen, from a three-wheeled motorcycle with parcels van, suitable for use by small laundries, men's furnishing stores, etc., to a 10-ton truck for hauling coal or large and heavy materials. There will be many special purpose machines, including motor fire apparatus, patrol wagons, ambulances, hearses, omnibuses, emergency wagons for street railways, dump trucks fitted with tipping bodies, operated by power from the motor, trucks equipped with power winches for hoisting purposes, and even a tractor truck for hauling plows in the field and driving threshing machines, circular saws, hullers and other farm machinery.

THE FIRST REGIMENT ARMORY LOOKING TOWARD MICHIGAN AVENUE, WHERE MANY TRUCKS WILL BE HOUSED

Prices are as diversified as construction, and range from as low as $.50 per pound of carrying capacity to more than $3. One might take his choice of a 16-20 horsepower, two-cylinder gasoline wagon of 1500 pounds capacity, selling at $650 complete, or an electric delivery wagon of 1000 pounds capacity at $3,500. The selection should depend on such considerations as where the vehicle is to be used, nature of business engaged in, class of trade, kind of drivers employed, and so on.

Only once a year is the opportunity afforded to inspect so many makes and such different models of industrial, commercial and municipal power vehicles with so little effort and in so short a time. One might spend a week at any other time visiting agencies in Chicago and not see half so many.

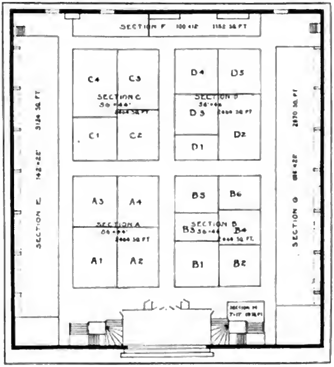
As was the case last year, the management, under the direction of Samuel A. Miles, general manager, has been sending out letters for many months past to reliable merchants within the adjacent territory asking them to visit the display and picturing the advantages. Many replies have been received, and as the campaign this year includes all rated at $25,000 or over by either of the big credit agencies, it is expected a hugh attendance—and a buying one—will be produced in this way. Last year the mailing lists included only those firms or individuals with a credit of $50,000 or more, yet a record attendance was obtained in this manner, while the exhibitors united in declaring it the best purchasing power they have ever known.

Last winter the business cards handed in were retained and tabulated by trades or businesses. A table of these has been given out recently, this including all those at both the Garden display in New York and the Coliseum in Chicago. So much interest attaches to these that they are presented herewith. They give an excellent idea of the wide variation in the class of persons who are in the market for some form of commercial vehicle and as such may be expected to attend any good show nearby where they may obtain a better idea of the various machines.

Attendance by Trades at New York and Chicago Shows

Trades Represented.	Total No. Cards Preserved.	Proportion in 1000.
Building and contracting	247	77
Metal manufacturing	194	61
Lumbering and lumber yards	190	60
Grocery	190	60
Printing and publishing	165	52
Machinery	147	46
General merchandising	113	35
Municipal officials	97	30
Hardware	93	29
Clothing	91	28
Furniture	91	28
Produce and commission	88	27
Coal	79	25

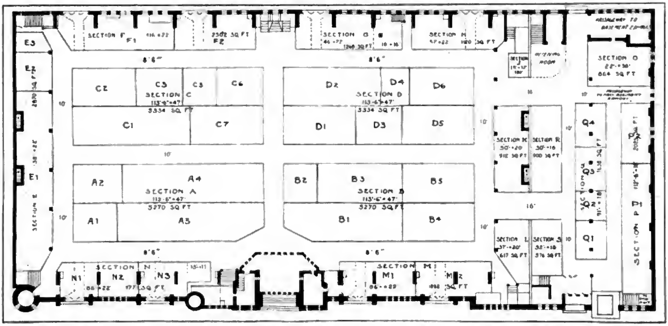
Trades Represented	Total No. Cards Preserved.	Proportion in 1000
Iron, steel and other metals	73	23
Building materials	78	24
Textiles, trimmings, etc.	68	21
Storage warehousing	65	20
Expressing	66	20
Trucking and delivery	71	22
Brewing	59	18
Oils, greases, etc.	53	16
Undertaking	48	15
Laundry	48	15
Electric machinery and apparatus	48	15
Paints and varnish	48	15
Railroad officials	46	14
Drugs and chemicals	38	12
Pianos	47	15
Heating, plumbing and ventilating	35	11
Railroad equipment and supplies	34	10
Grain, hay and feed	35	11
Packing (meats)	34	10
Baking	35	11
Paper manufacturing	27	8
Woodworking, etc.	27	8
Rugs and carpets	25	7
Flowers	24	7
Roofing	23	7
Liquors	22	7
Mineral waters	18	6
Meat	18	6
Ice	18	6
Hospitals	17	5
Housefurnishing	16	5
Soap and perfume	16	5
Telephone service	17	5
Illuminating companies	15	5
Wagons, carriages, etc.	14	4
Boxes and barrels	14	4
Cigars and tobacco	14	4
Importing and exporting	14	4
Milk and dairying	11	3
Milling, flour, etc.	11	3



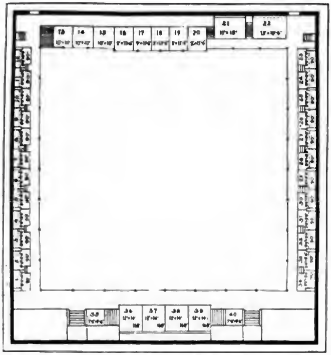
MAIN FLOOR PLAN OF THE ARMORY, SHOWING DISPOSITION OF EXHIBITS

In this connection it might be suggested that the buying power does not vary altogether with the numbers present, for 100 brewers would represent more purchasing power than an equal number of grocers or bakers. Moreover, in the size and types of vehicles acquired, the former would leave a greater profit in the industry than would the latter, granting that both made purchases.

The Chicago display will be as large as the two New York shows taken together. Last year the Coliseum was just comfortably filled with the 40 firms showing, but this time every inch in that structure and all of the available area in the First Regiment armory will be required to accommodate the eighty-odd makers. Since the former alone has more space than the Garden, and the



GROUND LEVEL LAYOUT OF THE COLISEUM AND ANNEX WITH DISTRIBUTION OF THE LARGER EXHIBITORS



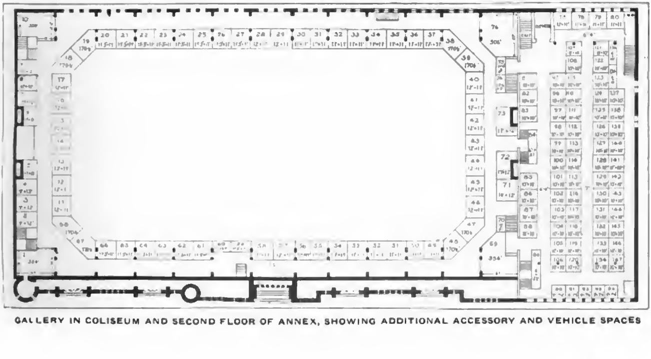
FIRST REGIMENT GALLERY, WHERE THE ACCESSORIES WILL BE FOUND

latter much more than the mezzanine floor of the new Palace where the trucks were placed, it is seen that aside from the requirements of so many makers the actual buildings to be used will furnish all the space required.

As the interior view herewith, taken especially for the COMMERCIAL VEHICLE, shows the decorations will be different from last year as well as from preceding displays. The ceilings of the Coliseum will be a series of mural paintings, while light-blue panels with mahogany borders and smaller panels of similar design cover the girders that support the balcony. Numerous pillars surmounted by hugh vases interspersed with much vine-covered trellis work will produce a dainty effect and take away much of the hardness and severity due to the straight lines of the car and truck exhibits.

In the armory the decorations suggest the Louis XIV period. From the flat ceiling are suspended hugh baskets of foliage, concealing the arched roof, while the walls will be of a corresponding design to those of the larger structure. Fifty great chandeliers will serve to illuminate the two buildings, each containing eight 500-watt tungsten lamps. In addition a large number of smaller lights will be scattered around the structures to give a maximum of brilliancy. It is expected that the reflection of all these lights from the polished bodies and parts of the cars, even the commercials with less expensive finish, will produce a particularly pleasing effect.

The history of the Chicago displays is particularly interesting since it portrays in a passive way the growth of the industry. National shows have been held in Chicago each year since 1901. They have always been managed by Samuel A. Miles under an arrangement with the National Association of Automobile Manufacturers. Originally the show was housed in the Coliseum and the Annex, but as the demand for space increased with the growth of the industry the First Regiment armory, located at a stone's throw from the Coliseum, was secured to house the overflow exhibits. Owing to the fact that since 1905 New York has each year had two individual shows, aside from the Importers' Salon, the Chicago show has long been the biggest of the separate national exhibitions. During the period that the litigation concerning the Selden patent was pending, and when one of the New York displays was being held under the auspices of the "Licensed Association," and the other by the corresponding unlicensed organization, both factions exhibited together in Chicago under the same roof. Last year, it may be added, the first commercial display was held, filling but one building. The fact that both will be crowded this time indicates the advance of the past twelvemonth. What next year will bring forth is problematical; possibly a division of vehicles into light and heavy classes, each occupying the Coliseum for an entire week; perhaps a huge open-air display held in the fall or early spring; who can tell?



GALLERY IN COLISEUM AND SECOND FLOOR OF ANNEX, SHOWING ADDITIONAL ACCESSORY AND VEHICLE SPACES

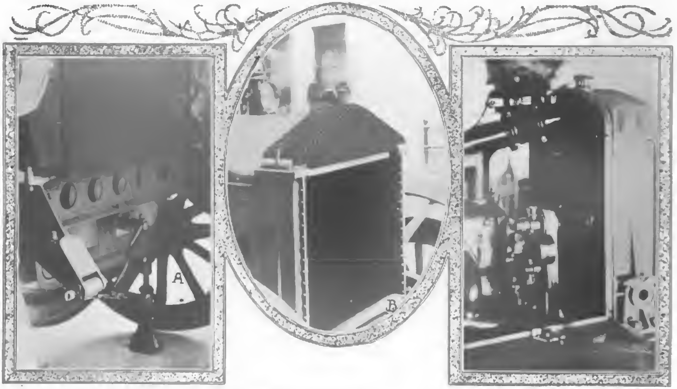
How the Radiators Are Supported & Protected

With Special Reference to Those Features Noted at the Recent Big Shows Which Have a Bearing Upon Operating Efficiency

TWO factors of great importance enter into the question of the life of the radiator. The first and most important is the protection against the road shocks and vibrations, while the second is that against collision. Every radiator has to stand the continual jarring that is occasioned by the irregularities of the road, and hence it is that the prominent truck manufacturers of the day have begun to take more or less elaborate precautions to render the radiator as immune from these jars and vibrations as it is possible to do while it has to be carried on the same vehicle as the motor. The precautions which should be taken against collision vary to a large extent with the nature of the service of the vehicle. Whatever is done in this respect, however, has the one requirement that it must be sufficiently strong to withstand a severe shock.

Outside of the question of radiator protection, one of the trends noticeable at the shows was a marked increase in the accessibility of design in the radiators of the newest trucks. Accessibility had become one of the chief assets of the gasoline motor and any strides made in this direction are always beneficial. The radiator filler cap has been enlarged on many of the recently improved types of cars, and this is to a great degree very essential; the difficulties of pouring water into the smaller holes can be judged best by those who have attempted this feat on a cold day. The radiator repairs have been facilitated to a great extent by the ability in some instances to remove the defective member and repair it singly and then replace it in its position. In other cases, while it is not possible to remove the particular tube or section of the radiator which has become leaky through collision or otherwise, the radiator may be swung about in such a way that it is possible to make the repair with a minimum amount of trouble.

In the illustration at A, the method used on the Velie trucks in protecting the cooler is shown. The radiator is guarded by a heavy meshed screen, which pro-

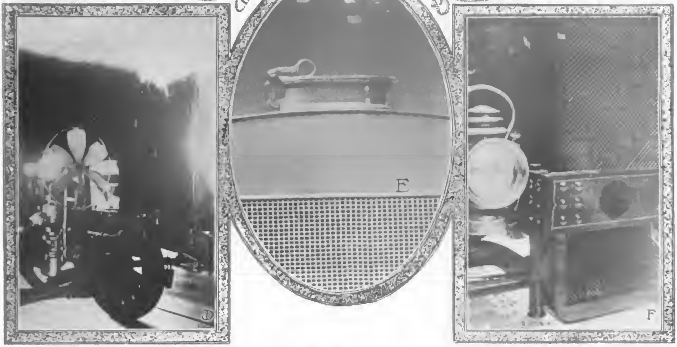


Three Novel Radiator Forms of Special Design and Unusual Merit

A—Velie Radiator support and protection afforded by a heavy metal screen, hung in front of the cooler about 1.5 inches from it. The front frame cross member also protects it and the spring horns

B—Special design of horizontal tubular cooler utilized on Pierce-Arrow five-ton trucks. The upper portion or water reservoir has air cooling flanges and may be removed at will by taking out a few bolts

C—On the Commer trucks, the radiator is set upon trunnions of large diameter at the base, while the movement at the top is limited by means of a special clamp which can be altered to get the right distance



Some Additional Radiator Features of Distinct Design and Merit

D—Front of the New Knickerbocker truck, showing the hinged cooler and front cross member, which may be swung out of the way in order to have access to the motor. In addition the radiator is on springs

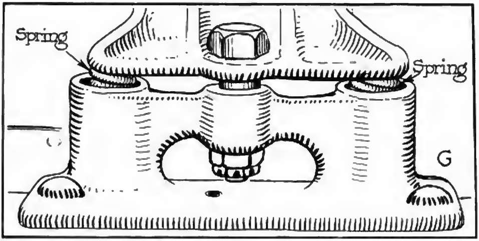
E—The filling cap on the new Locomobile five-ton truck is of a peculiar shape which lends itself to quick filling. This is hinged at the right hand end, with a double folding clamp at the left

F—Spring suspension of the Speedwell six-ton vehicle's cooler showing how the double coiled members, one above, the other below, cushion all possible road shocks, whether up or down

tects it against any of the lighter blows such as would be occasioned by the truck striking some projection of either a vehicle in front of it, or through any of the other causes which would be likely to cause a blow of sufficient strength to damage the radiator. The screen is held, as may be seen, by projecting strips of metal at the end of the frame, the metal which binds the screen being bolted to these strips firmly so that a resistance of great strength would be opposed to any blow which could strike the center or upper part of the radiator. Besides this strong screen the heavy channel beam, which forms the end member of the frame, passes across the radiator. This cross member of the frame is fastened to the end members by means of two clips at either end, through each of which pass two heavy bolts connecting the beam to the side members. As there is a great margin of strength in this beam it is possible to lighten the structure to a considerable extent by punching the five lightening holes, which may be observed in the illustration. The flanges of the member, which are turned forward, lend a stiffness to the structure which amply protects the radiator against the possibility of damage through any ordinary collision, and it is safe to say that before the radiator would be harmed by collision the motor would be destroyed by the shock.

The method of protecting the Velie radiator against the ordinary vibrations encountered is also unique and may be seen in the same illustration. A strap in which the radiator is suspended is supported by a spring, which is shown at K. This curved spring will take up the shocks of the road and hence the jar which is transmitted to the radiator will diminish to a great extent. The radiator is very accessible with this manner of attaching, as it may be readily lifted out for repair.

The Pierce radiator is of



Supporting the Radiator on Springs Is Now More General

G—Sketch of the suspension utilized on the Universal three-ton commercial cars, bringing out the method of cushioning shocks, but still holding the radiator firmly without side play. The coil springs are stiff enough to prevent movement by the hand or less than 150 pounds weight

More Radiator Support, Filling and Protection Details

H—The Universal just described bringing out the unique position back of the driver's seat, which protects the radiator from bumps, and the screen which directs air currents to it from the fan flywheel

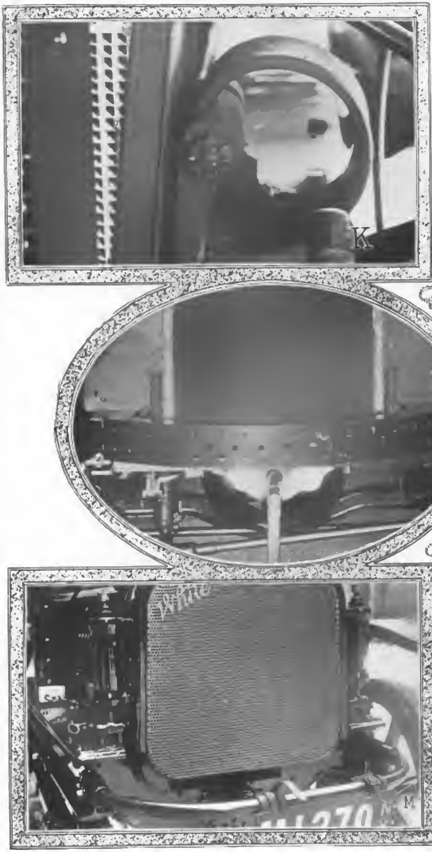
I—Heavy protecting screen utilized on the Hewitt vehicles, which have their radiators on springs as well. This covers the entire front and is of a very heavy galvanized iron wire which will resist anything

J—The cross bar at the front of Walter chassis which guards the delicate cooler from ordinary dangers at that point. This is a heavy tube with a stout internal bolt holding it firmly in place

unique construction, as may be readily observed in the illustration at B. The radiating fins at the top resembling very much those found in some types of pleasure cars. It is of accessible design, however, and may be readily repaired at any point. The unique construction of the radiator itself, however, does not bear to as great an extent on the life of its parts as the manner in which it is attached to the vehicle. At C, the method of supporting the Commer radiatoron trunnions is shown. This construction has found great favor and there are a great many points which help to make this construction popular; chief among them, however, is the elasticity and play which the radiator is given, so that the shocks instead of falling on a fixed body, are taken up in the oscillations of the moving part. In the Knickerbocker truck another form of practice obtains. As may be seen in the illustration, D, the radiator is carried upon the front member of the frame of the car. This whole part, by an ingenious arrangement, may be swung back as easily as a door, while at the same time none of the strength is sacrificed. A large pin, which is shown in the illustration, passes through holes in the same manner as the coupling pin of a railroad car, thus holding the radiator tightly in place when the car is in operation. Vibrations are taken care of in an up-and-down direction on this radiator. The coil springs,one on either side, are arranged to act in vertical guides. The weight of the radiator is taken upon these springs so that the shocks are to a great degree absorbed and are never fully transmitted to the radiator. The method of constructing the parts is well shown in the illustration, as is also the ease with which the motor may be reached for inspection, by swinging back the radiator.

A very effective way of taking up the vibrations when the radiator is under the seat is used on the Universal commercial vehicles. This is illustrated at G and H. There are two helical springs held in position in the casting shown in the sketch. The foot of the radiator rests upon these springs, which carry the entire weight. In the center of the casting, between the two springs, there is a guide arranged so that there is no tendency to slip off the springs. This guide consists of a heavy well-lubricated bolt, which will not permit the part to rise off the springs, while the springs prevent the shocks of the road reaching the radiator to any extent. The Speedwell radiator is also carried on a very efficient spring device, which is depicted at F. In this case the springs are both above and below the point at which the weight is taken. The radiator is carried by the front member of the frame, but the point of application is below it, while the springs are so arranged that the long bolts which hold the weight of the radiator act as guides. Protection is afforded against collision by the front member of the frame, which passes across the radiator. Lightening holes are cut in the channel in the same manner as described for the Velie.

A study of the Victor truck radiator at L, and the White at M, shows two contrasted methods of arriving at the same end; that is, the protection of the radiator against collision. On the Victor a heavy arched bumper is used, a solid wall of metal which is lightened only by the small holes which have been punched through. In the case of the White truck the light form of bumper of tubular section is used. Both of these methods are strong and efficient, although performing their work by different means, one by main strength, while the other by a form of spring resistance. The vibrations on the Victor are well taken care of by the springs, which may be seen in the illustration.



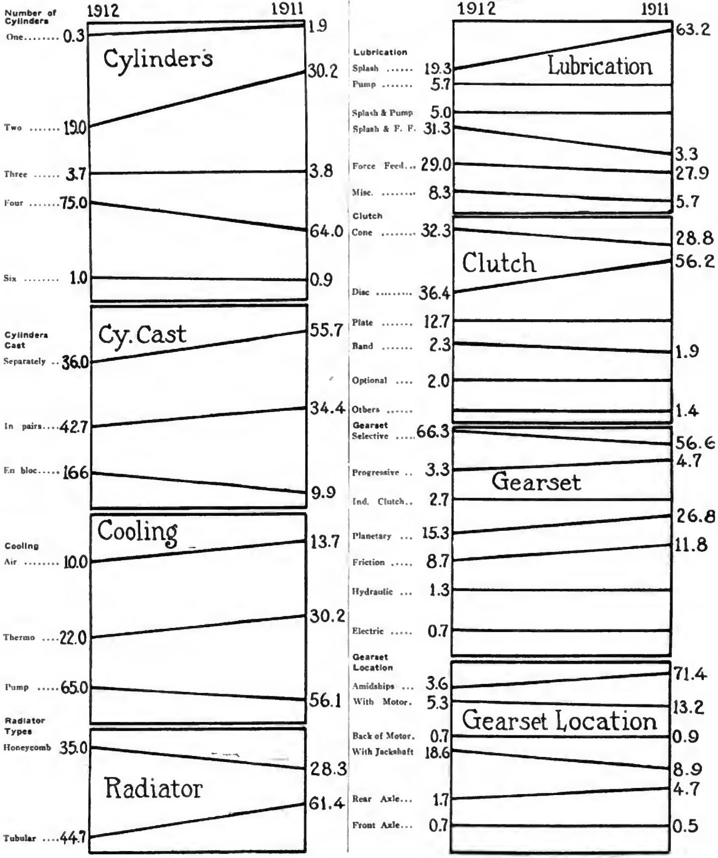
New Frame Fronts Showing How the Radiator is Considered

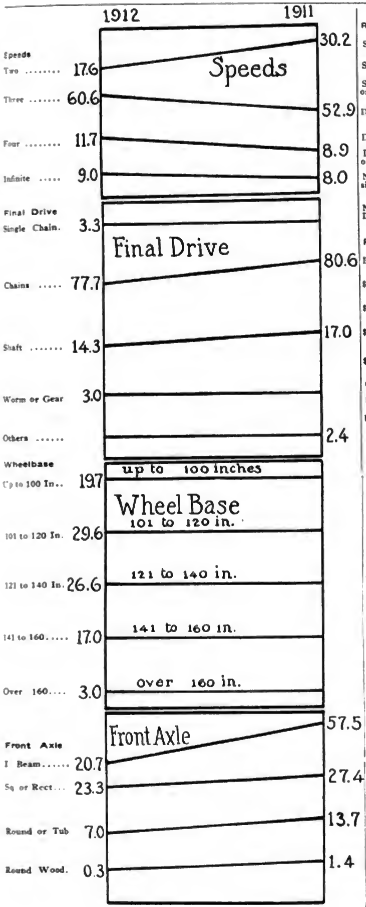
K—Velie leaf spring and linkage which carry the cooler, the former being fixed to the frame at one end, the other carrying the link to which is attached the flexible band that really carries the unit

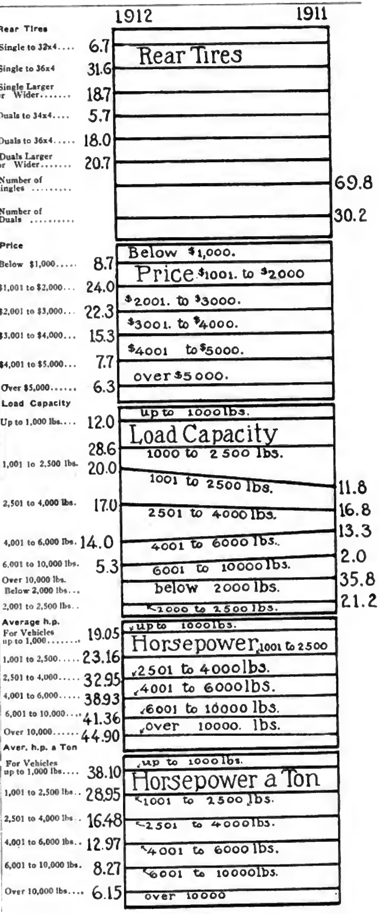
L—Front of the Victor three-ton truck seen at the Palace with double protection in the way of spring suspension and front frame cross member. The latter is drilled full of holes for air passage

M—On the new five-ton White truck the radiator is supported on two large diameter cylinders as shown, these containing long spiral springs. An inside rod braces and guides the cooler during movement

Statistics of the 1912 Commercial Cars in Chart Form



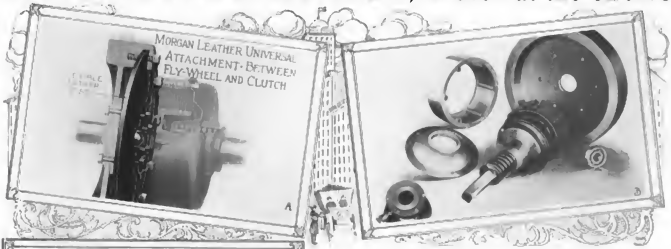

1912
1911
Speeds
Speeds
Two 17.6
30.2
Three 60.6
52.9
Four 11.7
8.9
Infinite 9.0
8.0
Final Drive
Final Drive
Single Chain. 3.3
Chains 77.7
80.6
Shaft 14.3
17.0
Worm or Gear 3.0
Others ......
2.4
Wheelbase
Wheel Base
up to 100 inches
Up to 100 In.. 19.7
101 to 120 in.
101 to 120 In. 29.6
121 to 140 in.
121 to 140 In. 26.6
141 to 160 in.
141 to 160..... 17.0
over 160 in.
Over 160.... 3.0
Front Axle
Front Axle
57.5
I Beam...... 20.7
Sq or Rect... 23.3
27.4
Round or Tub 7.0
13.7
Round Wood. 0.3
1.4

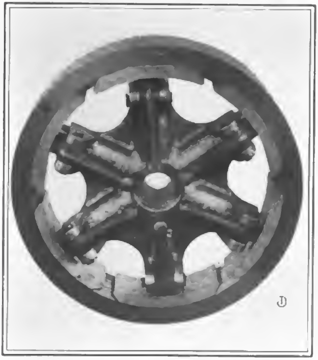

1912
1911
Rear Tires
Rear Tires
Single to 32x4.... 6.7
Single to 36x4 31.6
Single Larger or Wider....... 18.7
Duals to 34x4.... 5.7
Duals to 36x4..... 18.0
Duals Larger or Wider....... 20.7
Number of singles ....
69.8
Number of Duals ....
30.2
Price
Below $1,000.
Below $1,000..... 8.7
Price $1001. to $2000
$1,001 to $2,000... 24.0
$2001. to $3000.
$2,001 to $3,000... 22.3
$3001. to $4000.
$3,001 to $4,000... 15.3
$4001 to $5000.
$4,001 to $5,000... 7.7
over $5000.
Over $5,000...... 6.3
Load Capacity
up to 1000 lbs.
Up to 1,000 lbs.... 12.0
Load Capacity
28.6
1000 to 2500 lbs.
1,001 to 2,500 lbs. 20.0
1001 to 2500 lbs.
11.8
2,501 to 4,000 lbs. 17.0
2501 to 4000 lbs.
16.8
13.3
4,001 to 6,000 lbs. 14.0
4001 to 6000 lbs.
2.0
6,001 to 10,000 lbs. 5.3
6001 to 10000 lbs.
35.8
Over 10,000 lbs.
Below 2,000 lbs...
below 2000 lbs.
21.2
2,001 to 2,500 lbs..
2000 to 2500 lbs.
Average h.p.
For Vehicles up to 1,000........ 19.05
up to 1000 lbs.
Horsepower 1001 to 2500
1,001 to 2,500..... 23.16
2501 to 4000 lbs.
2,501 to 4,000..... 32.95
4001 to 6000 lbs.
4,001 to 6,000..... 38.93
6001 to 10000 lbs.
6,001 to 10,000.... 41.36
over 10000. lbs.
Over 10,000...... 44.90
Aver. h.p. a Ton
For Vehicles up to 1,000 lbs.... 38.10
up to 1000 lbs.
Horsepower a Ton
1,001 to 2,500 lbs.. 28.95
1001 to 2500 lbs.
2,501 to 4,000 lbs.. 16.48
2501 to 4000 lbs.
4,001 to 6,000 lbs.. 12.97
4001 to 6000 lbs.
6,001 to 10,000 lbs. 8.27
6001 to 10000 lbs.
Over 10,000 lbs.... 6.15
over 10000

THE TREND IN TRUCK TRANSMISSIONS

BY D. R. Hobart

Also Modern Clutch Construction, as Seen at the Shows


MORGAN LEATHER UNIVERSAL ATTACHMENT·BETWEEN FLY-WHEEL AND CLUTCH
A
B



Some Notable Clutch Features from the Recent Shows

A—Flexible clutch attachment on the Morgan vehicles, with a leather disc connection between flywheel and clutch discs

B—The multiple disc form used on the Alco five-ton truck, showing the parts and bearings

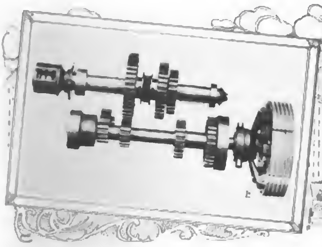
C—Universal joint and clutch spinning brake on the Walter truck, indicating comparatively large braking surface

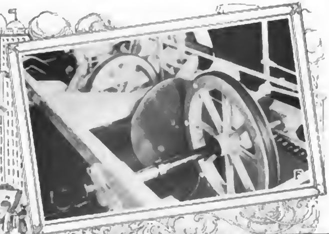
D—Expanding form of clutch used on the Mais vehicles, showing the external ring and the expanding toggles

WHILE finality in the types of transmission most suitable for commercial vehicles of different load capacities has by no means been reached as yet, still excellent indications of a strongly-marked approach toward standards have been noticeable each season, and particularly so for 1912. The conditions under which any vehicle is to be operated are understood better by the user and prospective buyer, and also by the builder himself; the personal factor—the driver—and the class of labor from which he is drawn to operate the vehicle, in a great measure dominating most of the other conditions. Thus, for the light vehicle, of load capacity up to 1000 pounds, the driver is often a youth in the employ as a delivery-boy or clerk, and the transmission consequently is very easy to operate and as near "foolproof" as possible. In the case of the five-ton truck, the driver commands higher wages, is relatively more intelligent and the transmission may be comparatively more complicated.

Taking up the small car or light van, with live load capacity up to 1000 pounds, the two-speed planetary gear, mounted in the majority of cases amidships, is seen on a small majority of makes with the two-disc type of friction transmission as second. The former, as a rule, is operated by a hand lever for the high and low speeds, with a pedal for the reverse and transmission brake when such is fitted. The latter in general has the disc mounted on the motor-shaft and movable axially when the position of the wheel is changed to get the desired ratio between the two members. Final drive is by side-chains in the majority of cases, and this is true also of the vans fitted with planetary transmission.

The selective sliding gear transmission also has fair representation, the set being likewise fitted amidships with the





Additional Clutch and Some Transmission Features

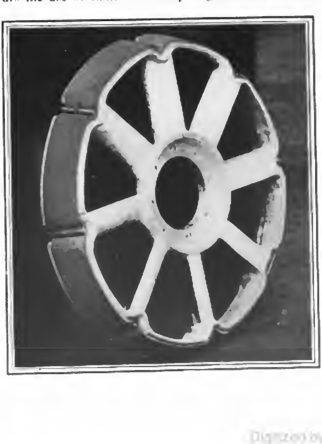
E—Complete Mais transmission without casing and with the clutch, revealing the size of shafts and gears
F—Friction transmission as used on the Commerce low-priced delivery wagon where simplicity is imperative
G—Friction drive and flexible coupling on the Poss, another moderate priced delivery wagon chassis of merit
H—Cone clutch from the White commercial vehicles, showing the eight springs for gradual engagement

final drive by side chains in most instances. Three speeds forward are provided with but few exceptions. In connection with this form, a simple clutch of the cone or plate type is used, the multiple disc being apparently in disfavor, possibly because of its relative complication, care necessary in maintenance and first cost, the latter being a serious proposition on account of the prices at which these vans are sold. Of unusual forms, the liquid transmission on the Maxim tri-car is the only example; in this a plate on the extension of the motor shaft rotates in a casing provided with diaphragms fitted with shutters. Variation of the relative speed of the casing and motor shaft is obtained by operating the shutters, the liquid acting as a clutch.

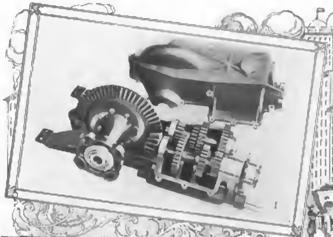
It is noticeable that the adherents of the planetary transmission in general have employed the same for one or more seasons, and have continued the form, as it has given satisfaction. The friction adherents, on the other hand, are for the most part new-comers, there being but a mere handful who have had their product in service for more than one season. Among the latter are Lambert, Hatfield and the International, while the planetary forces number among their ranks Reo, Buick, Overland and Detroit.

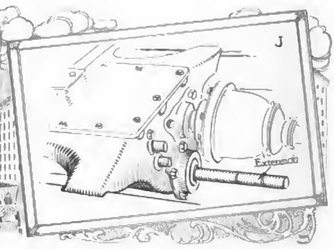
In vehicles from 1000 to 3000-pounds capacity, the selective type of sliding gear transmission with three speeds is in the overwhelming majority, the final drive for the most part being by side chains. Representation on the part of the planetary gear indicates in the more moderate priced and lower load capacity vehicles that there is a demand for the greater simplicity of the latter form of transmission on the part of buyers and the backing of the planetary forces is very substantial. The tendency, however, is toward the general adoption of the sliding gear for the heavier loads. Friction transmission is seen on a small number of cars, none however above 2000-pounds capacity, and those for the most part who employ the same form in pleasure car service. Shaft drive has lost considerable ground since the opening of the 1911 season, and in all probability may be entirely supplanted by the side chain in the future.

The general tendency toward simplicity has resulted in an increase in the number of cone clutches fitted, but there has on the other hand been practically no loss of adherents of the multiple disc type. On the chain-driven cars the use of radius rods only is general, there being



but few instances of torque rods between the gear set and jack-shaft construction, and these in the larger cars. On the shaft-driven cars and those using a live axle and single chain the torque and radius rods are conspicuous by their absence. Worm drive has representation only in the Franklin, and as in other and larger load capacities, if anything, suffered a retrogression rather than an increase in partisans. This construction, necessitating the employment of a live axle, naturally suffers under the increasing tendency toward side-chain drive. Examples of this drive are to be seen in the Chase McIntyre, Grabowsky, Victor, Sanbert, and Sullivan; shaft drive wagons are well exemplified in the smaller Kisselkar and Autocar, although the latter has a double gear reduction in the rear axle casing, which has been distinctive of that make for a number of seasons. Single-chain drive cars include the Cartercar, Lambert and Commerce.





Some Meritorious Transmission Features of Trucks

I—Selective gear box on the Alco trucks, with the cover and part of the differential casing removed to show the parts

J—Layshaft extension on the new Velie three-ton chassis for the fitting of a winch, hoist, belt driving pulley or other accessory

K—Top of the Peerless change speed box showing the large handhole which is used for inspection as well as lubrication introduction

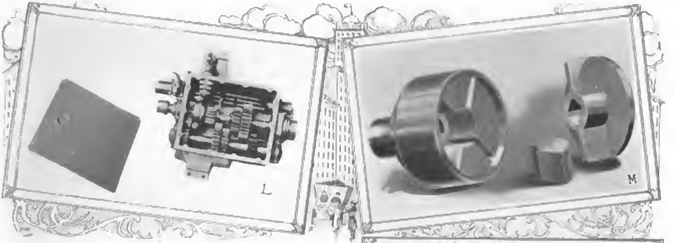
While the light vehicles show considerable diversity in transmissions, and drives, the trucks from 1.5 up to three-tons capacity show practically the total adoption of the selective sliding gear transmission with final drive by side chains. The friction type is represented by the Lambert and the planetary by Hewitt, the latter being about the only manufacturer that has shown the reliability of this form for any size of commercial vehicle, from 500 to 20,000 pounds capacity. Both Hewitt and Lambert also employ side chain drive. Clutches show a strong tendency toward a more general use of the multiple disc type, but with the plate and cone types well represented. In the majority of sliding gear transmissions three forward speeds are employed, but a tendency is noticeable toward the use of four speeds, and the next season undoubtedly will see an increase in the use of the larger number of gears in spite of the increased cost of production of a four-speed set over that of a three. The use of a fourth speed in the gear set gives a lower first to the vehicle, enabling it to carry the full load under conditions where the relatively higher first speed of a three would necessitate towing or the removal of part of the load. It also enables the carriage of an additional cargo on a trailer, and this also is made more practicable by the intermediates of the four-speed set, which would not necessarily be the case with the other of less speeds. There being two intermediates instead of one, this enables the motor to be driven at or nearer its best speed for negotiating hills, sand or snow than in the other instance. The practice of putting on all the cargo that the vehicle can carry has its evil effects somewhat mitigated, as the driver can change down to the third (indirect) speed and the motor drive the truck without running at speed on the single intermediate of the three-speed set or groaning on the high (direct drive). Of an overdriven fourth speed and direct drive on the third there are but two examples, White and the new Lozier. The use of this fourth speed is stated as convenient to enable the driver to return to the station at a speed greater than when running under load and thus save time under "no load." Examples of four-speed gearsets are seen in the Gramm, Newark, De Dion, Bussing, Lauth-Juergens and Mercedes. The Commer, Mack and Morgan represent the dog-clutch type of gearset, with three speeds forward, while the Packard, Universal, Decatur-Hoosier, Grabowsky, Knox and Walter are among the adherents to three speeds with selective sliding gear.

The Walter three-ton truck is fitted in one model with a new multiple-disc transmission known as a "continuous-torque transmission." In this the gears are in mesh and each main member has a sleeve fitted at the end with a multiple-disc clutch. The sleeves are all concentric and the male members of the clutches on plates mounted on the line shaft. A progressive movement of the change-gear lever successively engages the clutch next in order and disengages the clutch just let in. The reverse is operated by a separate clutch and is engaged by the lever having movement in the reverse slot of the regular grid.

Both torque and radius rods are fitted on a number of the chain-drive trucks, an example being the Packard, where the gear set and jackshaft construction are integral. The torque member is triangular, with the base attached to the front part of the gear set housing and the apex fitted to a carrier from the middle cross-member, springs being fitted to take the torque action and reaction. The general practice, however, is to mount the gear set behind the motor and the jackshaft amidships on three points: one on a cross-member and the others to the side members of the frame. A departure from both of these mountings is seen on the Universal truck, in which clutch, gear set and jackshaft are in a unit mounted on three points as just stated. The clutch being of the multiple disc type, the unit is very compact. On this truck present practice in the use of I-beam radius rods is well illustrated; these rods are pierced to get lightness and have the adjustment by nut and right-and-left screw at the front end.

It is on the larger trucks that diversity in transmission is most marked. Drive, however, is with but few exceptions by side chains, the exceptions being De Dion, with double cardan shafts from the frame-suspended differential casing; Mais with double axle (one carrying the load and the other the differential and drive axles); Pierce, Rowe and Newark by worm-driven live axle, and Mercedes also with the worm reduction and live axle. In the cases of the De Dion and Mais, the shafts have pinions which mesh with annular gears mounted on the rear wheels. The radius roads are, as a rule, of the I-beam section type, but exceptions are the pressed-steel spectacle-shaped rods on the Commer and Knickerbocker trucks. The "lenses" on these rods act as guards for the sprockets. On the Hewitt trucks, the radius rods are part of triangular pressed-steel construction with the adjustment by right-and-left thread at the forward ends, turnbuckles being used on the sizes under seven tons. On the 10-ton models, the radius rods are of similar section, but lock nuts are used to make adjustments. The usual position of the rods is from the axle outside of the spring seats to the jackshaft hanger, the rod thus being outside of the frame, but in the Gramm, the rod is under each side member of the frame. The fitting of chain cases is having more attention paid to than ever before and examples of this practice are seen in the Knox, Sampson, Commer and Saurer.

In the trucks with capacities of from three to seven tons the four-speed selective sliding transmission shows an appreciable gain, and that four speeds are in some cases more desirable a number of makers of three-speed gearsets offer a four on the same chasses as an option. The reasons for the use of this greater number of speeds apply with even more weight than for the smaller capacity vehicles, but the three-speed following are to be seen in such numbers that more than a prophecy as to the final type of transmission and number of speeds is well nigh impossible. The arrangement of the gearsets is diverse: on the Aries, with four speeds, the gearset and jackshaft are a unit; on the Speedwell, with three speeds, the motor and change gear are mounted on a sub-frame and the jackshaft on the main frame. A spring-fitted torque member and I-beam radius rod inside the frame members with the adjustments on the rear ends are characteristic of this construction. On the Pierce the motor and gearset are on the main frame and the torque member is below the frame line and spring suspended from a tubular cross-member which is fitted to the rear spring front hangers. On the White, the motor and gearset are mounted in the forward part of the main frame and the

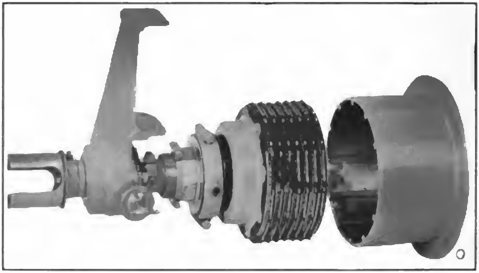


More Change Speed Gear Design Features of Merit

L—The transmission for the new Lozier five-ton truck with cover removed. This is a four-speed unit hung from three points

M—Flexible drive on Morgan trucks, in which a pair of rubber blocks set between flanges on the shaft take up all sudden jerks

N—The shifting finger on the Federal light commercial cars is placed in the center of the chassis, some distance from levers and transmission



An Excellent Example of the American Design of Dry Plate Clutch

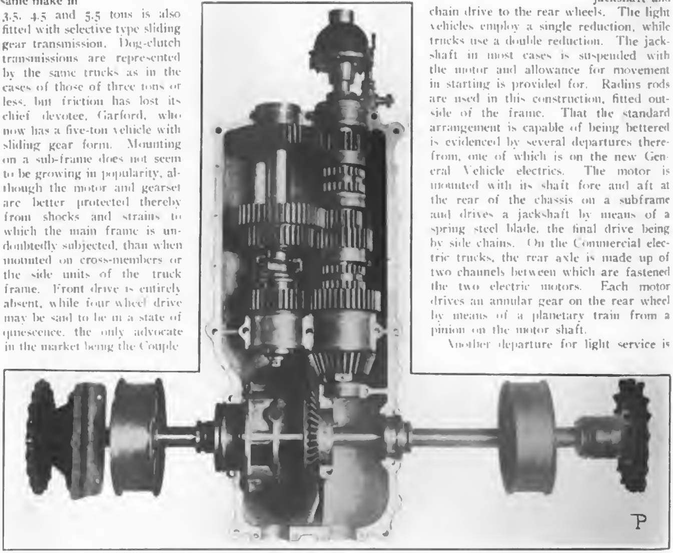
O—The Packard device in which steel discs faced with a heat-proof material contact with other steel discs unfaced. The whole is enclosed in a light metal casing which prevents the entrance of dirt. At the rear end is a special bearing to prevent lack of alignment, while the supporting arm straddles the channel section frame at the rear end, bolting to it top and bottom.

jackshaft on end hangers below the side members, there being no front support and the radius rods are inside the frame.

As in the case of the trucks of up to three-tons capacity, the planetary gear is represented by Hewitt, in 5.5, seven and 10-tons capacity, while the same make in 3.5, 4.5 and 5.5 tons is also fitted with selective type sliding gear transmission. Dog-clutch transmissions are represented by the same trucks as in the cases of those of three tons or less, but friction has lost its chief devotee, Garford, who now has a five-ton vehicle with sliding gear form. Mounting on a sub-frame does not seem to be growing in popularity, although the motor and gearset are better protected thereby from shocks and strains to which the main frame is undoubtedly subjected, than when mounted on cross-members or the side units of the truck frame. Front drive is entirely absent, while four wheel drive may be said to be in a state of quiescence, the only advocate in the market being the Couple Gear, with gasoline motor and electric transmission or with storage battery and motors as in the majority of electric vehicles.

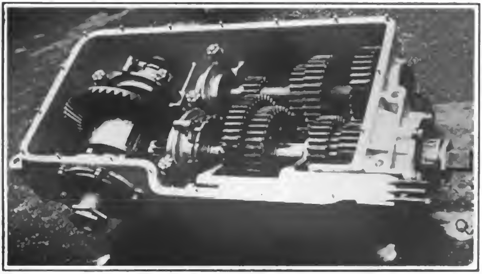
In the electric commercial vehicle, the general form of mounting of the motor is below the frame with reduction gear between the motor and jackshaft and chain drive to the rear wheels. The light vehicles employ a single reduction, while trucks use a double reduction. The jackshaft in most cases is suspended with the motor and allowance for movement in starting is provided for. Radius rods are used in this construction, fitted outside of the frame. That the standard arrangement is capable of being bettered is evidenced by several departures therefrom, one of which is on the new General Vehicle electrics. The motor is mounted with its shaft fore and aft at the rear of the chassis on a subframe and drives a jackshaft by means of a spring steel blade, the final drive being by side chains. On the Commercial electric trucks, the rear axle is made up of two channels between which are fastened the two electric motors. Each motor drives an annular gear on the rear wheel by means of a planetary train from a pinion on the motor shaft.

Another departure for light service is



Individual Clutch Transmission Operating on the Selective Plan

P—The Mack gearbox with cover removed to show the position of gears and clutches. This form has a series of external gears meshing with similar internal members, while the main gears are always in mesh and do not shift. A connection between the high speed, which is a direct drive and the principal driving gear on the secondary shaft, throws the latter out of engagement as soon as the high is engaged. This action is entirely automatic, as is the reverse operation of throwing in the layshaft when a lower speed is desired

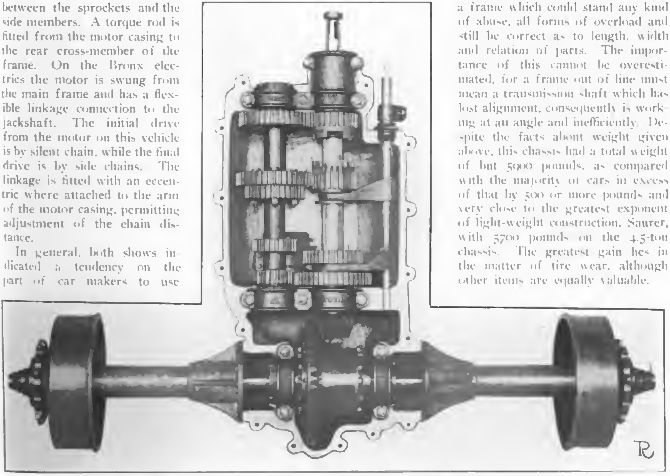


Detail of the Transmission Used on One of the Newer Trucks

Q Since the Peerless vehicles were brought out but one year ago, they may be classed as newer types. The illustration shows the gearbox used on these, this being of the three-speed selective type. The gears are of wide face with long but strong shaft mounted on efficient bearings. The case while large is light in weight and the shifting connections, both inside the case and out, are simple in form and not liable to derangement

on the Argo wagon, where the motor is suspended from the frame at the front end and forms part of the rear axle housing at the rear. This, like the others, has the conventional battery position between the axles and in a casing below the frame. On the Ward wagons, live axle drive is used with radius rods to the motor casing. In the Lansden vehicles the motor is transverse of the frame and drives by silent chain forward to a jackshaft with final drive by side chains. The radius rods are between the sprockets and the side members. A torque rod is fitted from the motor casing to the rear cross-member of the frame. On the Bronx electrics the motor is swung from the main frame and has a flexible linkage connection to the jackshaft. The initial drive from the motor on this vehicle is by silent chain, while the final drive is by side chains. The linkage is fitted with an eccentric where attached to the arm of the motor casing, permitting adjustment of the chain distance.

In general, both shows indicated a tendency on the part of car makers to use heavier sections of metal where necessary, a notable example of this being the new Velie three-ton chassis. In this the main frame side members were of a heavy section I-beam. Ordinarily a manufacturer going to this form of structural steel will employ only the lighter weights, but this firm, with a commendable disregard of all precedent, used the heaviest. More than that, all cross-members were constructed from the same material with large gussets above and below. The result was a frame which could stand any kind of abuse, all forms of overload and still be correct as to length, width and relation of parts. The importance of this cannot be overestimated, for a frame out of line must mean a transmission shaft which has lost alignment, consequently is working at an angle and inefficiently. Despite the facts about weight given above, this chassis had a total weight of but 5000 pounds, as compared with the majority of cars in excess of that by 500 or more pounds and very close to the greatest exponent of light-weight construction, Saurer, with 5700 pounds on the 4.5-ton chassis. The greatest gain lies in the matter of tire wear, although other items are equally valuable.



The Transmission Utilized on the New Gramm One-Ton Truck, The Latest Addition

R—Plan view of the three-speed selective gear which is used on the newest addition to the Gramm line, a one-ton truck with many excellent features. In this picture, note the wide face of the gears, the shifting mechanism, size and bearings on the shaft and general outline of the case which houses the entire piece of mechanism. On its larger vehicles, this firm utilises the four-speed gear box, but on the smaller unit it was considered that this was not applicable with as much force, while the additional cost would be unwarranted.

1912 Frames, Chassis and Running Gears

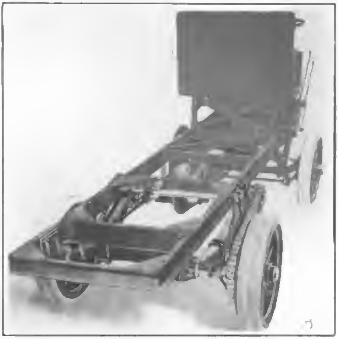
The Modern Tendency in These Important Parts of the Motor Truck as Revealed at the Big Displays Just Closed—Materials Used and Sub-Frames

TENDENCIES in frames for gasoline trucks and for the heavier delivery wagons point toward a still further increase in use of pressed steel of channel section for the longitudinals, but the shapes used for cross members are varied, some being of channel section, others tubular, others again flat. There are frames with but two cross members, one the rear member and the other the transmission supporting member, the remainder of the staying members being represented by the motor feet, jackshaft casing, etc. But a large number of manufacturers adhere to the cheaper form of frame, rolled steel of channel, angle or I-beam sections, and there are good representatives of the armored wood and rectangular section wood frames. The latter are, however, in the category of heavy and light delivery wagons, and the truck fitted with other than an all-metal frame is the exception. Furthermore, pressed metal now has as many adherents numerically as the other forms.

Thus it will be seen that apart from the growing employment of the pressed channel steel frame there is great diversity, and finality will not be reached for some time to come. The truck has not reached the point as yet where throat-cutting competition is the order of the day, and it may be that when this stage of the industry is reached, the prices made will in many cases necessitate the abandonment of the relatively expensive pressed steel frame for the more economical rolled article. In the lighter vehicles, a similar state of affairs will probably result in an even more marked departure from the pressed frame member in favor of the armored or wood sill with metal cross members either forged or pressed.

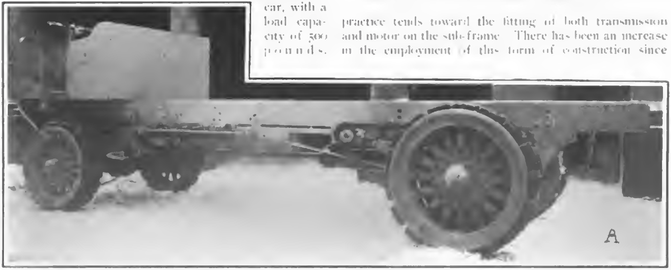
Tubular steel frames have but one representative, the Maxim tricar, with a load capacity of 500 pounds.

The use of the sub-frame for carrying the motor or the motor and transmission is considerable on a number of trucks of from three to five tons capacity, but the general practice tends toward the fitting of both transmission and motor on the sub-frame. There has been an increase in the employment of this form of construction since



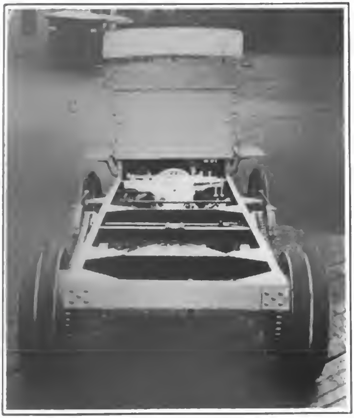
Rear of Alco 3.5-Ton Chassis Bringing Out Frame Details

B—This illustration shows not only the frame and springs on this vehicle, but the rear axle, driving chains and wheels, as well. At the forward end may be seen the driver's seat, which is a permanent portion of the chassis being built up of angle steel and plates. Note particularly the cross bracing through the frame's length



Side View of Big 10-Ton Hewitt Which Has Been Successful in Coal Hauling

A—In this regularly catalogued product, the great depth of side frame members will be noted, as well as the sub-frame upon which the motor and planetary transmission are mounted. The underslung rear springs of the semi-elliptic form and unusually deep curve can be seen as well. The wheel covers the helper spring which is directly above the square, heavy section rear axle



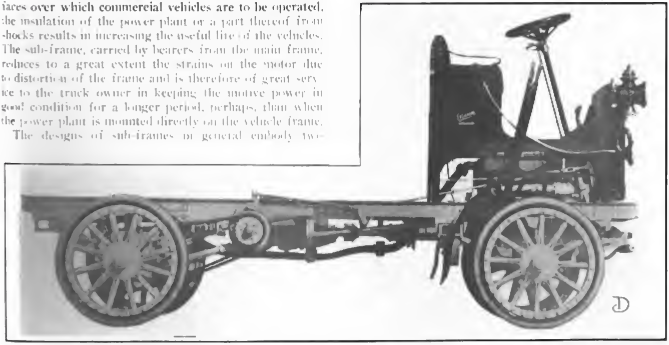
Another Rear View Bringing Out Meritorious Frame Features

C—Back end of the new three-ton Pope-Hartford product, showing the heavy channel section steel frame, the large gusset plates at the corners, cross braces and other items. The dual tires can be seen in this view giving a good idea of the width of rubber in actual contact with the street surface. Transmission and cab are not visible.

the 1911 season, showing that with the varied road surfaces over which commercial vehicles are to be operated, the insulation of the power plant or a part thereof from shocks results in increasing the useful life of the vehicles. The sub-frame, carried by bearers from the main frame, reduces to a great extent the strains on the motor due to distortion of the frame and is therefore of great service to the truck owner in keeping the motive power in good condition for a longer period, perhaps, than when the power plant is mounted directly on the vehicle frame.

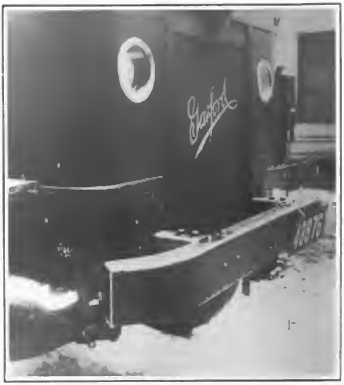
The designs of sub-frames in general embody two longitudinals supported at the front ends by the cross-member of the main frame and at the rear by another intermediate cross-member. This practice is typified in the truck by the Packers, Decatur, Speedwell, Velie, Knickerbocker and Grabowsky, and by the Autocar and Best in the lighter wagons. The Packers construction mounts the motor only on the sub-frame, the transmission and jackshaft unit being three-point suspended on the main frame. On the Knickerbocker and Grabowsky the longitudinals are prolonged beyond the cross-member at the front and the motor can be removed by sliding it forward. On the former, the front cross-member of the main frame is hinged at the left and fitted with a yoke which fastens to the right longitudinal of the main frame by a stout pintle-pin. On withdrawing this, disconnecting the spring bearers of the cooler and breaking the water connections, the radiator and member may be swung forward and the motor removed.

On the Grabowsky, the radiator is mounted above the motor, being incorporated in the dash, and the bonnet is of the Renault type, so that raising the latter exposes the motor on a false-frame slidable on the sub-frame. On the Autocar wagon, the whole sub-frame is mounted on three points: two forward and the third at the rear, all on cross members from the main frame. The Best friction-drive wagon has a peculiar "lyre" sub-frame: the rear consists of a yoke of I-beam section whose ends form part of the jackshaft construction and fasten to the main frame, while the apex forms a bearing for the main shaft from the motor. Two tubular members extend forward, one on each side to the motor and a cross-member at the rear of the two-cylinder opposed motor has coach springs which at-



Latest Product of the Gramm Company, a One-Ton Unit With Many Features

D—This picture reveals the frame and chassis details of the newest addition to the Gramm line, a 2000-pound vehicle. This incorporates all the distinctive constructional ideas of the larger cars, including driver over the engine, right hand control, very long levers, motor on sub-frame, transmission on cross members and large wheels. Note that the frame is a deep section structural steel shape.



Unusual Front Frame Construction on New Garford Truck

F—On the five-ton carrier produced by this designer for 1912, the forward portion of the main frame carries a long cross member of a section and weight equal to the main side members. This has the ends curved backward, the whole forming an excellent and most efficient radiator protection. The starting crank folds underneath

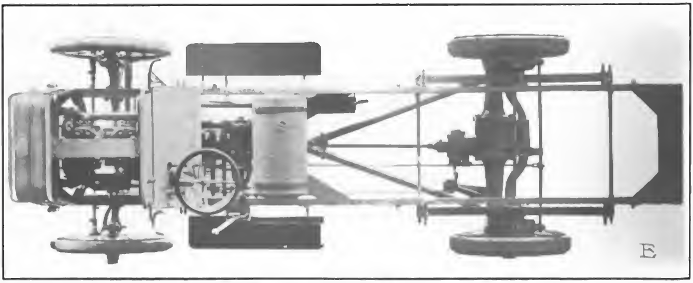
tach to hangers on the main frame. The power plant is thus spring-suspended forward and rocks through a small arc when starting, etc., while the effect is that of a unit power-plant and distortion between the motor and transmission reduced to a minimum, with the motor protected from strains. On the Stearns and Lozier five-ton trucks, the power plant is sub-frame mounted, but this is spring-suspended on the main frame, by semi-elliptical springs, and vibration and road shocks are practically eliminated from the motor and transmission.

Further diversity in sub-frame practice is seen in the mounting of the motor on the main frame and the transmission on a sub-frame, as in the case of the Lauth-Juergens truck. The differential casing has a projection forward which is attached to the rear cross-member of the sub-frame, so that the transmission and jackshaft construction on the model F forms a unit, with torque reaction taken by the sub-frame. On the Garford the motor only is sub-frame mounted and the combined transmission and jackshaft construction is on the main frame.

Reverting to the latter, the longitudinals are for the greater number straight, but there are several with the forward portions inswept. These number among others the Kelly, Speedwell and White trucks. On the Speedwell the insweep begins just at the rear of the transmission set and the members continue parallel from the line of the flywheel forward. On the Kelly the insweep begins just ahead of the flywheel and on the White in a similar position. The cross-members on the two former makes are of pressed steel with flitch plate reinforcements, while on the White 1500-pound chassis they are of channel steel with the rear cross-member strap-braced, and flitch-plated channel section on all other trucks of this make.

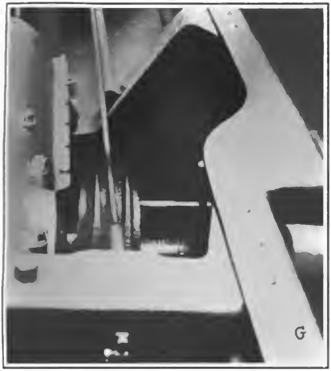
A variation in the straight side members is seen on the Saurer, just back of the jackshaft. The members are inswept, then continue parallel and again are outswept and continue parallel to the end of the frame. The rear springs are fitted within the recesses so formed and carrier plates serve to support the body; thus the latter is carried practically all along the frame and the track of the rear axle is reduced by having the springs in line with the straight portion of the longitudinals. This form of side member is expensive to construct, and it is doubtful if it will become popular, or its use increase in any measure.

In materials other than pressed steel, I-beam side mem-



Plan View of An Internal Gear-Driven Truck Showing Axles and Rods

E—One of the few trucks driven by means of internal gears is the Mais pictured above. The confidence of its designer and constructor is indicated clearly in the 1,000,000-mile guarantee given with each car. This illustration brings out the double axle, one the driver, the other the load carrier, as well as the torque and distance rods and other details of the unusual rear construction



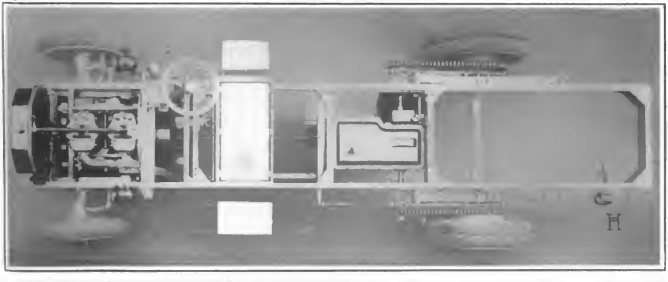
Notable Departure in Heavy Vehicle Frame on the Saurer

G—In order to gain a low center of gravity and at the same time maintain great width of spring base, the makers of this 6.5-ton vehicle have resorted to insetting the side members of the main frame for a distance slightly greater than the extended spring length. This should cost a large sum but the gains are worth it

bers are used on the Bussing, and rolled structural steel of channel section on the Morgan, Cass, Universal and Knox. The Bussing and Morgan are the chief exponents of the iron wheel, while with the exception of the Gaggenau, White and new Locomobile with steel wheels, others on the American market employ wood. The chief exponents of the wood frame reinforced with steel plates are the Chase and Franklin, both being fitted with air-cooled motors and in the medium wagon category. While the Franklin has wheels of motor car size, the Chase is fitted with wagon wheels, varying up to 40 inches in diameter with solid tires.

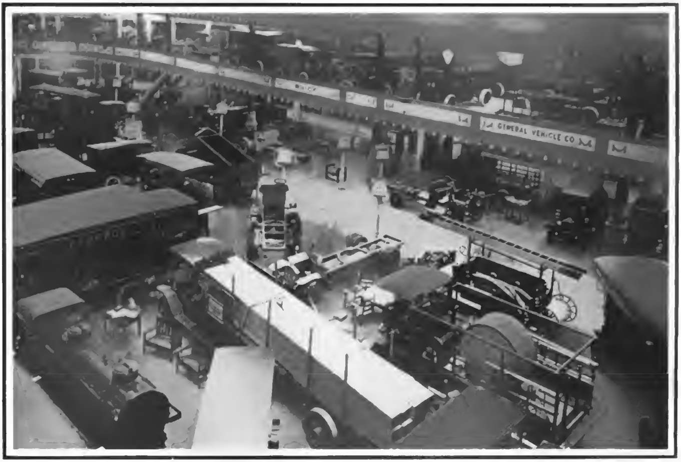
Axles are varied in design as well as in material and the trend of general practice seems to be toward the employment of front and rear axles of different design on the chain-driven vehicles of all classes. A considerable percentage, for example, use an I-beam section drop-forged front axle and a square or rectangular section forged rear axle, as in the cases of the Universal, Dayton, Packers, Knickerbocker and Velie. The arrangement is reversed, however, in the case of the Lauth-Juergens, where the front axle is rectangular. In the Peerless, Grabowsky, White and Cass both axles are I-beam section; the Packard has both of square section, while the Gramm has a square front and a round forged rear axle. The Morgan and Knox have I-beam front axles and round section rear axles, while the Atterbury is similarly fitted. The Aries has both axles of I-beam section and the Locomobile truck the front I-beam and the rear square. In the shaft-driven models, the Pierce has an I-beam front axle, the Autocar a tubular front axle and the White again an I-beam.

In the field of the electric, frames in general are of the I-beam or channel section rolled steel, with semi-elliptical springs fore and aft, in this connection following the general practice in gasoline commercial vehicles, where the full-elliptic or platform type is seen only in the very lightest vehicles. The majority of electric commercial vehicle frames incorporate a battery frame below the main side members; this is gridded and provided with end and fore and rear panels when the battery is in place. These battery frames are made of angle stock for the most part, even in the case of the Bronx electric wagon, where the main frame is of pressed steel, channel section. This frame tapers toward the ends and is fitted forward with dumb-irons and with horns for the rear springs at the rear. Built up with the frame are the hangers for the jackshaft, and the whole is stated to weigh 212 pounds for the 1000-pound capacity vehicle. On the General Vehicles the motor is mounted at the rear on a subframe, this being an innovation in electric vehicle construction.



Neat Lines of the Conventional Driver Behind the Motor Vehicle Design

H—The Peerless firm in its three, four and five-ton trucks has adopted the pleasure car location for the driver. Some idea of the clean lines resulting may be seen in this plan view of the five-ton chassis. Note the absence of superfluous rods and levers, also the size of the transmission case, specially designed for this work and containing large diameter, wide faced gears on husky shafts properly mounted



LOOKING DOWN UPON THE MADISON SQUARE GARDEN TRUCK SHOW—MAIN FLOOR AND ELEVATED PLATFORM

Commercial Show in the Garden

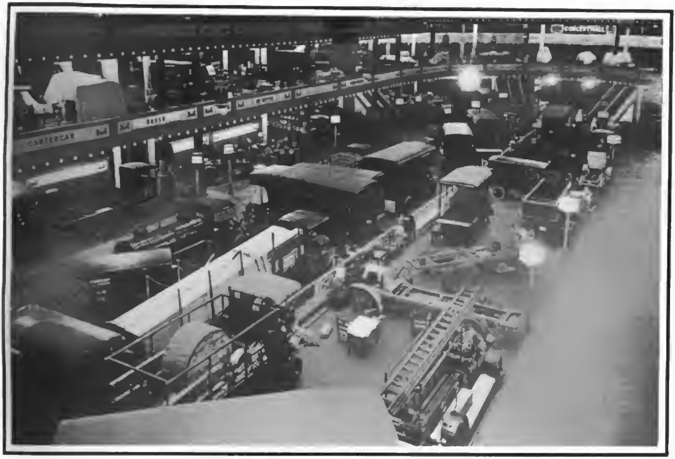
Last Annual Exhibition in Historic Building Shows Superior Design and Notable—Special Uses Made Very Prominent—Large

THE second exclusively commercial vehicle display, and probably the last annual automobile or truck show to be seen in the historic building which has housed so many, and particularly the extensive exhibits of the Association of Licensed Automobile Manufacturers, now the Automobile Board of Trade, came to a close in Madison Square Garden, New York City, on Saturday night, January 20, with a record of the greatest amount of public interest and the largest number of sales ever recorded at a similar exhibition.

To say that it was successful would be both trite and conservative. The exhibits as a whole were of a higher grade than ever before; the designs throughout showed a larger appreciation of user's problems and indicated the great amount of study which has been given this more efficient mover of the world's goods in order to make it still more efficient, and thus more necessary. The individual exhibits, when examined with care and a realization of these same items, revealed a wonderful number of small refinements, in themselves insignificant, but in the aggregate sufficient to make a vehicle a good one for the user by their presence, or a correspondingly bad investment by their absence.

Several new trucks were seen for the first time, a couple of which were entirely new, some new only in that this was their initial show presentation, while others were displayed in the Garden for the first time. A list of these names would include a number of our oldest and more conservative pleasure makers, names which have been synonymous with the highest quality and exclusive production for many years, the product being classed by general consent with the best in America. There is little doubt that the appearance of these vehicles at this time did much to enhance the glory and prestige of the display, and raise the general standard, high as it was previously.

Besides those spoken of above as making their debut, there were quite a few cars on exhibition for the first time, these being the latest additions to their line on the part of other old makers in this field. In general, both these and the new makes revealed a



DIAGONAL VIEW OF THE DISPLAY TAKEN FROM THE NORTHEAST GALLERY AND SHOWING THE BALCONY

# Indicates Tremendous Progress

Construction—Also Wider Possibilities for Motor Trucks—Body Forms Crowds Mark Greater Public Interest in Power Vehicles

realization of mistakes made in the past, as well as an intimate knowledge of the present demands of merchants and other users. It was these matters which gave the drawing power and superinduced the buying. It is believed that in the next twelvemonth, when retrospect becomes a possibility, this display will loom up large as the influencing factor in the millions of dollars worth of sales effected in the Metropolitan area during the year 1912. It is now admitted that this portion of the country presents a field for something like 100,000 commercial cars within the next five years. If but one-eighth of this number be disposed of during the coming year at an average figure slightly in excess of $2,000, the money involved for the year 1912 will total something like $25,000,000.

In receiving this huge amount, it doubtless will be admitted later that the two big shows were the deciding factor in approximately two-thirds of the cases, and in almost all of the new buyers. Many people not entirely familiar with the situation look upon the holding of annual displays of this kind as a large economic waste, serving no useful purpose, but in the light of the above figures for this small section of the country and but two shows, that position is seen to be untenable. It is good policy in any line of human endeavor to spend, say, $100,000 to induce business amounting to $12,000,000 (that is, half the total).

On the following pages will be found a description of the various individual exhibits, with general and some specific illustrations, the idea being to mention only the cars displayed without any statement of their details. As the latter will be covered down to the uttermost point of value elsewhere in this and succeeding issues, such inclusion here would be but needless repetition. These were the exhibits, the arrangement being alphabetical by car names:

Alco, American Locomotive Company, New York City—Showed one 3.5-ton chassis, one two-ton truck with straight-sided steel body intended for carrying bottled beer in cases or similar products, and one five-ton steel coal-carrying vehicle. The latter had a gravity chute on the

SOME OF THE MAIN FLOOR VEHICLES AT THE GARDEN, NOTABLY THE PNEUMATIC DUMPER, SEEN IN FOREGROUND

side for delivering the material, the body being fixed in position. The notable features of the body work was the welding employed, no rivet heads being seen on the outside. In the way of advanced mechanical features, the governor for controlling the speed and differential lock were notable, also the accessibility of all adjustments. High-grade materials are used exclusively, resulting in a light weight which prolongs tire life.

Autocar, Autocar Company, Ardmore, Pa.—Eight cars shown, including a chassis and seven different body types, all of 3000-pound capacity. The forms were: Hotel bus with longitudinal seats; four-seated brake or sight-seeing car, this having cross-seats and side-doors; open type of delivery wagon, screen-sided light delivery, and the enclosed panel body; paneled undertaker's wagon, the few decorative effects being very ornate, and a low-stake platform truck. This make was one of the few shaft-driven cars in the show, other notable items being a short-stroke motor, controlled by an hydraulic governor.

Baker, Baker Motor Vehicle Company, Cleveland—Three varying sizes of the electric car were displayed in the balcony, including one 4000-pound chassis, one screen express body for the American Express Company on a two-ton chassis, and one 1000-pound paneled enclosed body. The latter was a notable sample of the coach-builder's art, being a bank vehicle. It had two small windows on each side, and one front and rear, all protected by steel bars. All cars were marked by left-hand control, wheel steer and controller lever just below the handwheel. As on many other electrics, the various headlights and lamps were lighted from the batteries.

Bronx, Bronx Electric Vehicle Company, New York City—This newcomer in the electric field showed two excellent chassis, one a heavy form of four tons capacity and the other a light wagon for handling 1000 pounds, a paneled delivery body on the latter chassis making the third member of a balcony group. All had left-hand wheel control, this member being of larger diameter. There were so many notable features about the larger chassis that this will be described in detail later on. Electric lights and the regular equipment with speedometer and ampere-hour meter or combination volt-ammeter were noted.

Brush, Brush Runabout Company, Detroit—Sharing a large balcony space with the Cartercar, another constituent of the United States Motor Company, were three of this company's products, a chassis and two paneled delivery wagons. These, it will be remembered, have a carrying capacity of 600 pounds. The features were wood frame, wood axles of a round section, the use of coil springs and a single cylinder vertical motor. Left-hand control with left-hand levers is retained.

Buick, Buick Motor Company, Flint, Mich.—This General Motors concern had one of the largest exhibits in point of numbers, totaling eight. These were of the same size, one ton, and carried the following body forms. Three-paneled delivery cars, low-stake platform, bus with longitudinal seats, democrat wagon with three removable cross-seats, flare-board express, and low-sided panel. The motor was of the two-cylinder opposed type, located under the driver's seat parallel to the center line of the car, a planetary transmission being placed on the shaft extension, and driving the rear wheels through three chains, one to the countershaft and two for the final drive.

Cartercar, Cartercar Company, Pontiac, Mich.—Three vehicles of 1000 pounds carrying ability, powered with two-cylinder opposed motors set across the frame beneath the driver's position, were noted. These were fitted with flare-board, screen and panel bodies. This car, it will be recalled, has a friction transmission, affording an unlimited number of forward and reverse speeds, eminently suitable for a low-priced vehicle, which is to go into the hands of a very poor class of drivers. With but one side lever and two pedals, the control is simplicity itself.

Detroit Electric, Anderson Electric Car Company, Detroit—This firm had an excellent location in the balcony, just at the head of one of the many stairways. In this were placed, with plenty of room for visitors, a 1.5-ton chassis, a one-ton screen and a 1000-pound panel delivery. Edison batteries are used exclusively; electric lights, hub odometer and ampere-hour current meter were noted. Left-side position for the driver and the placing of the controller lever above the wheel were characteristics seen.

Garford, Garford Company, Elyria, O.—Four trucks of five tons capacity were shown and one 300-pound quick delivery, the latter being mounted on a 40-horsepower touring chassis. This had a paneled body and the driver behind the motor, as compared with the standard truck construction in which he is alongside of it to save length. The four heavy vehicles included one chassis, one rack brewery body, one warehouse enclosed form and a high-sided paneled unit of steel for a prominent dairy. All forms have a four-speed selective type of transmission. The use of Krupp steel for springs and selected chrome and nickel steels for other parts made this one of the notable exhibits.

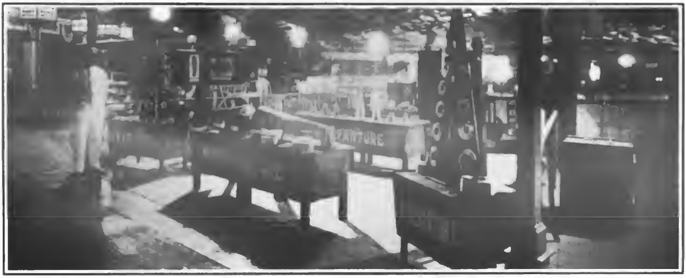
G V Electric, General Vehicle Company, Long Island City—The showing of this firm was remarkable for numbers and variety, in respect to the former being one of the largest individual groups in the building. They varied in size from a 750-pound delivery wagon with paneled body to a group of five-ton trucks in many different forms. Some of the intermediate ones were: One 1000-pound paneled delivery, 2000-pound flare-board express body with standing top, two-ton screen express, 7000-pound special brewery form with paneled lower part, screen upper and standing top. This last had a sliding door on each side, beneath which were small sliding steps for use in unloading cases of beer or other liquor. Aside from the many brewery jobs, a field in which this firm has made remarkable progress, the great point of interest was the one-ton industrial truck. This was a small vehicle for handling trunks, baggage or sim-

AS THE EXHIBITS WOULD APPEAR ON ENTERING THE HALL, SHOWING PACKARD DISPLAY AT RIGHT, POPE-HARTFORD LEFT ilar small but heavy articles in a somewhat congested and usually small area, such as station platforms and the like. It consists primarily of a square platform with stakes, on the one end of which a driver's stand is placed. On this is a brake pedal, and above two levers, one for steering, the other for the controller. This will be described and illustrated later. This exhibit included a special wheel and tire combination invented by Jacob Ruppert, the brewer, for use on his vehicles. Ready for use it looks like a very formidable steel-block member, but when the shoes have been removed it is not decidedly different from any rubber block tire, except for the permanent steel non-skidding units between the staggered biscuits.

Grabowsky, Grabowsky Power Wagon Company, Detroit—An extensive line was represented by a one-ton paneled delivery, two three-ton jobs, and a 10,000-pound chassis with flare-board express body. The 6000-pound units were large-sized panel body and chassis. This line of cars, it will be remembered, has the removable power plant, the radiator and water tank, as well as other units and driver so placed that the front of the frame may be opened, the unit removed and another inserted in less than half an hour. This is characterized by left-hand control with right-hand levers, this arrangement bringing the latter directly above the transmission, so that rods and levers are reduced to a minimum of length and useless weight. This form of construction was noted very generally in both shows.

G M C Electrics, General Motors Company, Detroit—An entirely new line of electric vehicles was shown in the balcony stand of this company, these being the newest departure of this huge organization. Despite this fact they are the product of a ripe experience in this, their designer, J. M. Lansden, having been the head of the concern which bears his name from its inception to last summer. The cars reveal a number of novelties, the most noticeable of which is the general appearance closely resembling a gasoline car. This is brought about by placing the battery box above the frame near the front end, where its upper forward edge forms the location of the driver's seat. A steering wheel on a tilted post, with control lever above it and automobile type pedals on the footboard help to complete the illusion. Following the latest practice, this is located on the left side. For the battery position, which apparently gives a higher center of gravity and a waste space back of the driver equal to nearly three feet, the advantages claimed are greater clearance and correct weight distribution. A noticeable feature of the mechanical portion of the chassis is the flexible spring drive from the motor to the countershaft, this consisting of a flat plate of steel measuring approximately two by .1875 inches. Four jobs were shown, a three-ton chassis, six-ton rack brewery form, 3000-pound flareboard express with standing top, and enclosed omnibus with seating capacity for about 15 inside and half a dozen more outside. The latter was a notable specimen of the coach builder's art and attracted not a little comment.

END VIEW OF THE BUILDING, SHOWING THE BALCONY, GALLERY, FORMS OF SIGNS UTILIZED AND ELECTRIC EXHIBITS



NEW DEPARTURE DISPLAY OF BEARINGS AND OTHER PARTS IN THE BALCONY, INDICATING CHARACTER OF DECORATIONS

G M C Rapid and Reliance Models, General Motors Company, Detroit—The same concern showed a large and varied group of gasoline cars, previously called Rapid and Reliance, in its ground-floor space. There were seven of these, as follows: One three-ton (Reliance) low-stake platform with side-gate for wholesale grocers and similar houses, two-ton (Rapid) chassis, one-ton (Rapid) screen delivery, 3.5-ton (Reliance) chassis, three-ton (Reliance) warehouse van or moving body, five-ton (Reliance) rack brewery body with low sides, and two-ton (Rapid) low-stake platform. On the Reliance forms the driver is placed above the motor with a right-hand position and right-hand levers as well, but on the Rapid designs he is situated on the left with the control levers in the center. The former vehicles have a three-speed progressive transmission, while the gearsets in the latter affords four speeds and operate selectively. The first is a very heavy and somewhat cumbersome job with a cast-iron case, while the latter is much smaller and more delicate, the material being aluminum. The last has gears of about one-inch face and less, while the former ranges from twice that upwards. On the Rapids all brakes are manipulated through positive rods and levers, while on the others cables are used with corresponding lack of accuracy. To sum up in a few words, the former showed a modern design, the latter a much older one.

Hewitt, Hewitt Motor Company, New York City—The new company now controlling the destinies of the vehicles with this well-known name displayed a nice selection of vehicles, from a carefully designed one-ton chassis to the familiar 10-ton machine, which is said to be the largest regularly catalogued. Between the two come a 3.5-ton chassis, a new model, and a seven-ton brewery form with load of empty kegs. As is known to all familiar with truck details, the older Hewitts all had planetary transmissions. This form is retained on the 10- and seven-ton sizes, but the two newer and smaller vehicles were shown with sliding gear forms. The one-ton had a block motor and left-hand control, while the new 3.5 revealed a plate clutch, different springing and shackles, transmission shaft extended for a winch or hoist connection, governor on the motor, special exhaust pipe construction and many other modern features of worth. It is understood that the new interests which take hold with sufficient financial backing will fill in all the gaps in the line, so that a complete list from the smallest to the largest will be available in the product of the one factory.

Knox, Knox Automobile Company, Springfield, Mass.—This pioneer company in the motor truck field showed but five vehicles, due to lack of space, a sixth constructed especially for display reposing in the unused and closed basement. Those exhibited were: One 3000-pound paneled body of large area for a Philadelphia cheese firm, five-ton high stake platform truck with side gate, five-ton chassis with fire pump for the town of Weehawken, N. J., and six-ton chassis with rough platform upon which was mounted a Martin-Knox tractor. The unseen member was a combination chemical and hose wagon of the type which this concern has made famous. For the season of 1912 this concern will furnish a starter for a very slight additional charge. The larger models had a chaincase which enclosed completely the driving members. Combination headlights are furnished with a source of electricity in case the use of this is preferred. A governor to control the motor speed is an additional option. Despite the very small space into which the four units were crowded, they made an excellent showing, the fire pump in particular being a rallying place for firemen during the entire week. The Martin-Knox tractor with trailer and heavy load, which was kept outside of the building, attracted much attention also.

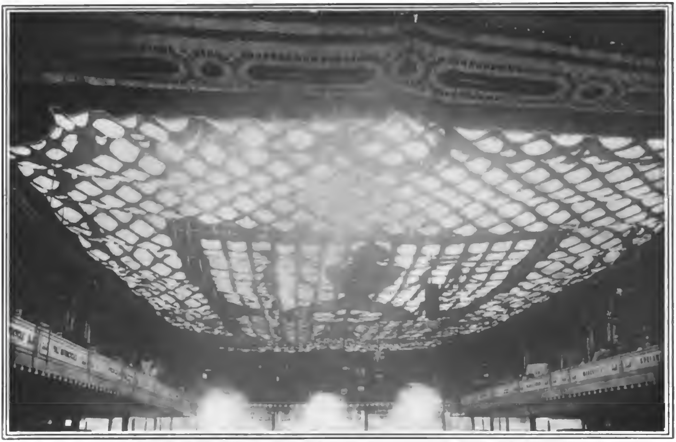
Lansden, The Lansden Company, Newark, N. J.—Four vehicles, all driven by Edison nickel-iron batteries, were displayed in the balcony. These were: One 1000-pound chassis, one-ton panel delivery for a department store in Brooklyn, two-ton flareboard with standing top, and three-ton panel meat body with top. The smallest unit showed left-hand control with the control lever on the steering post below the handwheel. Besides the batteries and usual electric lighting, notable points were the countershaft drive by silent chain and the standard equipment with ampere-hour meter, hub odometer and other accessories.

Locomobile, Locomobile Company of America, Bridgeport, Conn.—The advent of this old and conservative firm into the commercial realm was notable in that the car produced is a heavy one of five tons capacity, and also in the many sterling features of its design. The driver is placed above a four-cylinder engine fitted with a ring type of governor, which drives through a dry disc clutch to a four-speed selective gearset. This contains very large and wide-faced gears. Accessibility has been made of prime import throughout.

Lozier, Lozier Motor Company, Detroit—A single five-ton chassis was exhibited in a large space on the main floor, this being the newest product of the company. It possesses many new ideas and represents in a measure the great advance which has been made in truck construction during the past two years. The operator is situated above a four-cylinder vertical motor on the right-hand side. His seat pivots so that access to the engine is a matter of loosening a few bolts only. The transmission affords four speeds, the third being direct and the high an over-geared speed for returning with an empty vehicle. Frame is very deep channel section pressed steel. Motor, radiator and the whole front construction are suspended on a pair of leaf springs to absorb all vibration. A governor controls the engine speed, this being set at 900.

McIntyre, W. H. McIntyre Company, Auburn, Ind.—A small balcony area housed three of these vehicles, the exhibit being presided over by the Schildwachter Carriage Company, Metropolitan distributors. The cars were 1.5-ton chassis, the body having been removed and set to one side, 1.5-ton low-stake platform, and one-ton platform of large size with top and sidegate, being intended for handling bedding and similar bulky material of light weight. The latter has a two-cylinder opposed engine, while the former is powered with a four-cylinder vertical unit.

Mack, International Motor Company, Allentown, Pa.—This firm's space was divided between the Mack and Saurer interests, although the former had the majority of the cars on exhibition. These were six in number, as follows: Seven-ton steel body dump truck in operation, seven-ton sugar vehicle with high-stake platform, five-ton brewery body with driver back of the engine contrary to this firm's usual position, three-ton telephone car with winch and other accessories, 3000-pound army water wagon carrying a huge filter and tanks, and 2000-pound chassis.



BEAUTIFUL RUG COVERING THE SKYLIGHTS AND ROOF GIRDERS WHICH MADE INTERIOR PHOTOGRAPHY DIFFICULT IF NOT IMPOSSIBLE

Morgan, Morgan Motor Truck Company, Worcester, Mass.—A steel dump body with a screw discharge was the feature of this exhibit. This was mounted on a five-ton chassis, and had an interior construction in which the walls tapered to a bottom passage in which a power driven Archimedean screw revolved by engine power. In addition, there was shown a three-ton chassis and a two-ton with flareboard body and top.

Packard, Packard Motor Car Company, Detroit—Eight vehicles completed the extensive display of this make, occupying a prominent position on the main floor near the entrance. These consisted of one two-ton low stake platform, one three-ton chassis and six others of the latter size with these bodies: The prairie schooner which crossed the Continent, nesting form of body, stake platform with sidegates, panel and screen job for a dairy, enclosed brewery wagon and paneled enclosed butcher vehicle. All but the last had the well-known Packard form of roof extension over the driver. This one was somewhat different in appearance and framework, giving the vehicle a smarter appearance. Referring to the newer two-ton car, it is an exact duplicate of the older model except in the sizes, that is, the two designs are identical.

Peerless, Peerless Motor Car Company, Cleveland—A very conservative showing of one five-ton chassis and various parts marked this exhibit. There were a number of features of the vehicle however to attract attention at all times. The driver is situated back of the motor with right-hand levers. The radiator was suspended on two big springs inside of the main frame to protect it, while a large filling cap allows of quick application of water. Following the modern tendency, the starting crank folds back under the frame out of the way. The rear axle is a straight I-beam form with a pair of coil auxiliary springs.

Pierce-Arrow, Pierce-Arrow Motor Car Company, Buffalo—A chassis and two complete trucks, all of the five-ton size, comprised this firm's showing. The latter were a steel dumper and a rack brewery body. The dump truck was of the Lally type with a vertical worm operated through a handwheel at the left side, and bevel gears and moving upward a nut attached to the front end of the body. It will be recalled that this chassis last year was the talk of the show on account of the worm drive seen on it for the first time. This construction is continued unchanged, although the radiator support and some small items are altered somewhat. Engine speeds are controlled through a governor, while a pawl is fitted to the driving shaft.

Pope-Hartford, Pope Manufacturing Company, Hartford, Conn.—This consisted of a chemical and hose combination fire wagon on the standard four-cylinder touring chassis, and two examples of the new three-ton truck. One of these had a stake platform body and the other a wholesale grocer form with stake sides, standing top and gates. The two latter had left-hand control with right-hand levers. The motor speed is governor controlled.

Reo, Reo Motor Car Company, Lansing, Mich.—Three samples of the 1500-pound delivery wagon were displayed to good advantage, these being a low stake platform, screen side and flareboard. The motor is a two-cylinder, long stroke, water cooled unit, placed under the footboard, final drive being by triple chain from the planetary transmission to countershaft, then to rear axle.

Sampson, Alden Sampson Manufacturing Company, Detroit—A big five-ton dump truck actuated by compressed air was the attraction at this booth, although other vehicles deserved equally as much attention. Besides this there was shown 1000-pound panel delivery wagon, 1.5-ton chassis, same with enclosed panel body and three-ton stake platform. The big truck has right-hand control with the driver above the motor, while on the 1.5- and three-tonners the operator is placed on the left side with the levers. The big fellow has a differential lock, operated from the side of the frame. Chains were enclosed in a steel case, which acted as a radius rod also.

Speedwell, Speedwell Motor Car Company, Dayton, O.—Of the two sizes which this firm will build for 1912, both were shown, one in two forms. The vehicles included a four-ton chassis and same with very wide flareboard platform, and a six-ton steel dumper. These cars have automatic spark advance, governor recommended but charged as an extra, differential lock, electric lights as an extra and radiators hung on double springs below the main frame. The upper transmission shaft carries an extra end, from which a sprocket drives a third shaft through chain. The last named has a worm, by means of which a cross-member is actuated, this forming the winch or may be used to operate a dump body.

Stearns, F. B. Stearns Company, Cleveland—Like Peerless from the same city, this exhibit consisted of a single five-ton chassis. It was a beautiful piece of work and drew much attention. The forward end of the subframe, carrying engine and radiator, is hung on leaf springs. The driver is on the left side but control levers are in the middle.

Saurer, International Motor Company, Plainfield, N. J.—The two vehicles shown, a 6.5-ton chassis and a 4.5-tonner with fire pump, were both imported jobs, although the Jersey factory is now in full operation. The notable feature of these is their exceptional light weight, making them economical of fuel and easy on tires and other parts which wear.

Studebaker, Studebaker Automobile Company, South Bend, Ind.—The space was given over to one 1000-pound electric panel delivery wagon, a Flanders 500-pound light car and a chassis. The former has a Westinghouse motor and carries speedometer and volt-ammeter, but as extras. The converted pleasure chassis is intended only for the lightest of city deliveries. The body showed a notable thing in a panel resembling a foredoor, but fixed on the right side.

Ward, Ward Motor Vehicle Company, New York City—This Metropolitan manufacturer showed a line of four light electric delivery cars, three in the regular space on the balcony level and one on the higher floor. These were 700- and two 1000-pound paneled deliveries, and one 1500-pounder of the same type but with wheel steer instead of lever. All these have underslung batteries and left-hand control.

Waverley, Waverley Company, Indianapolis—A complete line of electric commercial cars varying from 700 to 7000 pounds was displayed. All of these had left-hand control, while the largest job was marked by the use of two motors, one for each rear wheel. The vehicles were 700-pound panel delivery (with Edison batteries this is rated at 1000 pounds carrying capacity), 1500 screen delivery, 2500-pound and 3.5-ton chassis.

White, White Company, Cleveland—This exhibit drew many because a new vehicle of five-ton capacity was showing for the first time, while its steel tank body attracted almost as much attention as the lumber body and trailer propelled by another five-ton unit. The latter was loaded with 12 sticks of heavy lumber about 10 by 10, 24 feet long, making the entire outfit about 32 feet long over all.

Mixed Show Successful in New Palace

Combination Exhibition of Pleasure Cars and Trucks in New York's Latest and Most Ornate Building Draws a Big Crowd and Much Business Is Done—Simple Decorations Effective—The Cars Shown

THE initial display of motor cars of all classes and accessories therefor in what is said to be the future home of all such attractions was opened at the New Grand Central Palace, on Lexington avenue two blocks above the old structure bearing the same name, on Jan. 10, for one week. Although a combination show, that is, including commercial vehicles as well as pleasure cars, it had much to contend with, for the Garden opened its first week on the previous Saturday, while the weather was no more propitious than it used to be when the exhibits were inaugurated on New Year's Eve.

Despite these handicaps, if they may be called such, the display was a success from the start; the big building was pronounced perfect for this purpose by the critics and the management had everything in place previous to the opening time. If there was any measure of detraction from the entire affair it was based upon the accessory men's opinions purely and simply. They were not well cared for, it is true, and their very small numbers made them more conscious of the lack of third-floor attractions and caused that part of the show to look like a joke, so bare did it appear.

For all of its magnificence and the classic beauty of the open spaces and Grecian columns, it was a difficult task for those used to more cramped quarters and the older show goers accustomed to much good-natured crowding and jostling to realize that this huge new structure was holding a complete automobile exhibition, in fact, one of the largest ever seen in the metropolis. Such was the effect of the very broad aisles, wide stairways, great height of the ceiling and open court. Yet, all were agreed that for a combination of shows such as the future is said to hold in prospect, the building would be ideal, since it would handle enormous crowds of people, its very spaciousness lending a pleasing turn to the thought of a society night when even the cars were invisible in the mass of humanity.

In the way of business done, all hands expressed themselves as well satisfied, although the competition of the Garden was noticeable, the pleasure section running parallel to the first half week and the truck division overshadowing the second. Despite this, many vehicles of both classes were sold and the exhibitors voted it a successful week and a profitable one.

It was too big a display, and the number and variety of cars present was too great to give more than passing mention of the various vehicles shown. The details will be cared for in the different subdivisions of the 1912 technical review running elsewhere in this and succeeding issues. Herewith is presented in alphabetical order just a bare mention of the number and size of commercial vehicles shown at the stands:

Argo. Argo Electric Vehicle Company, Saginaw, Mich.—In addition to several pleasure cars this firm showed three commercial vehicles, all electrics. These were 1000-pound chassis, 1000-pound paneled delivery

VIEW OF ONE OF THE PALACE BALCONY AISLES, SHOWING BOTH COMMERCIAL AND PLEASURE VEHICLES wagon and 2000-pound low-sided panel job. The feature of these was the final drive and motor suspension, the whole forming a single rear unit, flexibly suspended. The combination of gears is such as to produce absolute silence when running, so it is said. This is a new firm.

Aries, Jaccard & Co., New York City.—This imported vehicle was exhibited in two forms, but of the same rated load capacity, namely, a seven-ton chassis and the same with rack brewery body. It has a large number of notable features, among which the steel tires, engine governor, fixed spark ignition, and decompressor for starting were notable.

Atterbury, Atterbury Motor Car Company, Buffalo.—This firm had an excellent corner location, which brought out the advantages of the three sizes of vehicle displayed. These were one-ton open-sided delivery wagon with standing top, two-ton stake platform and three-ton high-sided brewery job. The intermediate size is a new one, and showed for the first time the block motor, left-hand control with right-hand levers and other features. This was one of the cars with spring radius rods to absorb starting torque.

LOOKING DOWN ONTO THE MAIN FLOOR, REVEALING INCIDENTALLY THE BEAUTY OF THE TALL COLUMNS

Best, Durant-Dort Carriage Company, Flint, Mich.—A single car, an 800-pound delivery wagon with its paneled body removed to show the mechanical features, comprised the exhibit of this Western newcomer. It has a two-cylinder opposed motor driving through a friction transmission, with final drive by side chains. One feature was an easily removable radiator.

Brooks, Brooks Manufacturing Company, Saginaw, Mich.—This car was formerly called the Duryea, after its designer, Charles E. Duryea, who has recently removed to the Michigan city from Reading, Pa. It possesses many extraordinary features, a two-cylinder, two-cycle, air-cooled motor being hung on the rear end of a triangular subframe whence it drives the two wheels direct—one cylinder to each—by friction rollers. The capacity is 800 pounds and a single screened type of delivery body was shown.

Cass, Cass Motor Truck Company, Port Huron, Mich.—One low stake platform body on a two-ton chassis was displayed, although this concern builds a one-ton size as well. This design includes many valuable points, for instance, unit power plant, radiator supported on trunnions, four-speed selective transmission, motor controlled by governor and auxiliary rear springs of the spiral type.

Chase, Chase Motor Truck Company, Syracuse, N. Y.—This well-known adherent of the two-cycle engine had six cars powered with that type of motor and an extra one on a subframe. The list included 1500-pound paneled delivery wagon, 2000-pound ditto, 2000-pound chassis, 2000-pound screen body, 3000-pound screen job and two-ton flare-board express truck. All these were fitted with three-cylinder, two-cycle, air-cooled engines, with oil fed in through the fuel tank. For the ordinary driver, this possesses marked simplicity. This was one of the two three-cylinder adherents in the display.

Commer, Wyckoff, Church & Partridge, Inc., New York City.—A most impressive showing of large trucks marked this concern's space, two of these being the initial productions of the Kingston, N. Y., plant, while the third was an imported article. The former were of 4.5 tons capacity and the latter carried a load of 6.5 tons. Both were marked by the Commer patented transmission, in which the gears do not shift. The imported vehicle had a most remarkable set of flat semi-elliptic rear springs, measuring some 68 to 70 inches in length by over three in width. The radiator, as pointed out elsewhere in this issue, is mounted on trunnions with a distance piece at the top to limit the amount of movement.

Commerce, Commerce Motor Car Company, Detroit.—This was another Western newcomer, and, like many of the others, had a friction transmission. The rig is of 1000 pounds capacity, a chassis and a panel delivery car being shown. The former was operating by means of an electric motor, to allow of an attendant showing and explaining the transmission. Final drive from the countershaft is by single chain to a divided rear axle.

Dart, Dart Manufacturing Company, Waterloo, Ia.—This was another low-priced Western car and a newcomer in the show ranks, at least in the East. Two vehicles having a load capacity of 1500 pounds were

CORNER OF THE VELIE EXHIBIT ON THE MEZANNINE FLOOR, SHOWING NEWARK IN THE BACKGROUND

shown, one a panel delivery and the other a flare-board express. The power unit is a two-cylinder opposed engine mounted parallel to the center line of the car and carrying a planetary transmission on the shaft extension, from which one chain drives the countershaft, and thence double chains to the rear wheels.

Dayton, Dayton Auto Truck Company, Dayton, O.—Two nice-looking medium-sized jobs were shown, one with a body. These were 1.5 to two-ton express with flare boards and three-ton chassis. In both of these and the third type not exhibited, the driver is mounted above the four-cylinder motor and the transmission is of the three-speed selective type, working through a multiple disc clutch. There were many neat ideas incorporated in the design, lubrication being particularly well cared for.

Decatur, Decatur Motor Car Company, Decatur, Ind.—A low-sided box body marked the 1.5-ton chassis, while another was displayed without body. The ready-for-use form had double pneumatic tires on the rear wheels, but it was explained that this was special on that order only. They attracted much attention, the outer one on each side being steel studded while the inner had a plain tread. A helper spring is fixed over the rear axle with roller ends to carry excess loads.

Eclipse, Eclipse Truck Company, Franklin, Pa.—Although a newcomer in the commercial car business, the firm had one of the most complete exhibits in point of number and variety of cars and features. Four were shown, one-ton flare board with top, two-ton chassis, three-ton screen express and four-ton stake platform with side gate and top. The Widmer starter was shown, with which all of these vehicles will be equipped regularly, thus ranking with one other as the only cars in the show so fitted. All sizes also have differential lock, governor and speedometer.

Federal, Federal Motor Truck Company, Detroit.—Three samples of its one-ton product were installed in this stand, a chassis, a screen delivery and a low stake platform. These have left-hand control with left levers, the driver being positioned back of his motor. Engine speed is governor controlled.

Gramm, Gramm Motor Truck Company, Lima, O.—During the first part of the shows this exhibit included three cars as follows: Two-ton express, three-ton chassis and six-ton sand dumper. Later in the week, however, two other forms were brought in, one of them, the new one-ton truck. The dumper drew the most attention, since it was operated constantly, the mechanism being driven from the transmission shaft, to which an electric motor supplied power for this occasion.

Hupp-Yeats, Hupp Corporation, Detroit.—Among its electric pleasure vehicles this firm had one 1000-pound delivery wagon. This was marked by left-hand control, a very low dropped front axle, small wheels and a short wheelbase.

Kelly, Kelly Motor Truck Company, Springfield, O.—One chassis and four forms with bodies constituted the showing of this make, which formerly was called the Frayer-Miller. It will be remembered that the engine in this is blower-cooled, a large fan on an extension of the crankshaft forcing air over the radiating flanges on the cylinders. The chassis was of one-ton capacity, and the others, one-ton open express, 12-passenger hotel 'bus on that chassis, two ton open express with side gate and three-ton packing house body.

Knickerbocker, Knickerbocker Motor Truck Company, New York City.—This exhibit marked the show advent of this metropolitan firm. It displayed three forms, three-ton screen-sided brewery body, four-ton coal dumper with gravity chutes, and five-ton chassis. These have the radiator hung on springs and the entire front so pivoted that it may be opened without any trouble, swung aside, and the engine, which is on a special hickory subframe, withdrawn.

Koehler, L. E. Schlotterback Mfg. Co., Newark, N. J.—A 1600-pound panel delivery wagon and two extra bodies comprised the showing of this firm, of which the H. J. Koehler Co., New York City, controls the output and furnishes the name. It has a two-cylinder opposed motor placed under the center of the body with the planetary transmission on a subframe.

Lauth-Juergens, Lauth-Juergens Motor Car Company, Fremont, O.—Two vehicles made an excellent showing, although this firm makes several more. Those seen were one-ton express with flare-board body and three-ton high-side brewery form with a removable side panel at the front end. The latter was marked by an inclosed cab for the driver, this protecting him from the elements. The radiator was protected by a front cross-bar. This firm makes its own four-speed transmission, operating selectively. The clutch is of the three-disc type.

Lippard-Stewart, Lippard-Stewart Motor Car Company, Buffalo.—Like many others, this concern was making its first appearance, but the product showed a wide past experience. The car is an assembled one, but of selected, proven units which can be recommended freely, giving a reliable vehicle from the very outset. The driver is mounted on the left side back of the Renault-type hood with short center levers. Radiator, muffler, transmission, clutch, engine, axles, in fact all parts may be removed quickly and readily without disturbing others. Fixed spark ignition helps to simplify the control mechanism.

Maxim, G. H. Bushnell Press Co., Thompsonville, Conn.—A single example of the Maxim tricar was shown, this being a specially designed package carrier of 300 pounds load capacity. The motor is mounted above the single front wheel, all control being effected through the single long steering lever.

Modern, Bowling Green Motor Car Company, Bowling Green, O.—Two cars were shown of 1000 and 1500 pounds carrying ability, respectively. These have four-cylinder motors and three-speed selective transmissions. The driver is placed behind the power unit on the left side with central levers. On the smaller form a cross-bar protects the radiator.

Motor Wagon, Motor Wagon Company, Detroit.—This is a new delivery car of exceptional simplicity and very low price. A chassis and five body forms were shown. These were two panel delivery wagons, a 'bus with three cross-seats, stake body and open-sided flare board with top.

Newark, Newark Auto Manufacturing Company, Newark, N. J.—This was one of the notable small exhibits, including as it did a worm-driven car. There were three vehicles, 1000-pound chassis, 1500-pound delivery car and 3000-pound chassis. The latter was the worm-driven member, this being only one of its many features; valves were inclosed, the radiator was made with a removable top, by taking off which vertical tubes could be replaced, control was on the left side. The four-speed transmission operated selectively, but the quadrant was constructed so as to force a progressive motion of the hand.

Packers, Packers Motor Trucks Company, Wheeling, W. Va.—Two samples of this firm's two-ton vehicle were shown, one a chassis, the other a special paneled butcher's body. This car follows standard lines with a four-cylinder vertical motor under the hood, three-speed selective transmission located amidships, and final side chain drive. High-grade materials are used throughout.

Poss, Poss Motor Company, Detroit.—This firm is one more of the Western newcomers. The vehicle is a

WHERE THE COMMER TRUCKS HELD FORTH, WITH A LITTLE BIT OF CHASE VISIBLE BEYOND AT THE LEFT

1000-pound carrier with four-cylinder block motor and friction speed change. Final drive is by a single chain to a live rear axle. A chassis and paneled delivery wagon were displayed, the former operating by electric motor.

Rowe, Rowe Motor Company, Coatesville, Pa.—At its stand on the mezzanine floor, this firm showed for the first time its 1500-pound and 2500-pound chassis, the former with longitudinal side-seat 'bus body and the latter with a high-sided box form containing a hand-operated winch. Both have four-cylinder motors of the conventional type, but both were worm driven.

Sanford, Sanford-Herbert Company, Syracuse, N. Y.—A chassis and a flare-board open express comprised this firm's showing. Both were of 1000 pounds capacity, powered with three-cylinder, air-cooled, two-cycle motors. The crankcase lubricant is fed with the fuel, while the main bearings are fed from external grease cups. The gearset is of the planetary type and final drive is by side chains.

Schacht, Schacht Motor Car Company, Cincinnati.—This Ohio firm relegated the commercial car to the background, its pleasure vehicles occupying all of the most prominent space. The former consisted of a single three-ton truck with flare-board open body. Except for left-hand control, inclosed valves, block motor and radiator suspension, there were no notable departures.

Sullivan, Sullivan Motar Car Company, Rochester, N. Y.—This is an old established carriage concern, having been in business in the camera city for over 50 years. The product is a low-priced light wagon, two being shown. These were of 1000 pounds carrying ability with panel delivery body and 1500 pounds with flare board. The motor is a two-cylinder unit, placed below the footboard, and the transmission of the planetary type.

Universal, Universal Motor Truck Company, Detroit.—Although all three parts of the exhibit were of the same capacity, three tons, more notable features or departures were noted than anywhere else in the show. The motor is placed at the front with the radiator behind it, so that by removing a front and two side panels the engine is perfectly accessible. A wood cross-member protects the engine, which is hung from the main frame by drop-forged cross-members. The cooler is on springs; starting crank folds under out of the way, countershaft bracket is free to slide vertically as well as allowed some rocking movement, governor is of the ball type, completely inclosed, and many other items vary.

Veerac, Veerac Motor Company, Anoka, Minn.—Many distinctive features were seen on this make also. It has a two-cylinder horizontal, air-cooled engine set across the frame, below and slightly back of the driver's seat. This is controlled much as a steam engine is, shutting off the flow of fuel to one cylinder gradually to reduce the power, until that member stops operating, and if still lower output is desired, closing off the other. In speeding up, just the reverse action is employed. The transmission is planetary. Two cars were shown, a 1500-pound chassis and 1500 high-sided panel body with top.

Velie, Velie Motor Vehicle Company, Moline, Ill.—Two three-ton trucks and a 1500-pound delivery wagon formed the total of this exhibit, the latter being a quick delivery on a pleasure chassis. The former, on the other hand, was most distinctly a designed commercial car, and possessed more individual features of merit than any other at either show. To begin with, it looked the part, the proportions throughout were such that every component in it appeared to be of just the right size. The motor was placed on a subframe so as to be removed easily, the radiator was protected from flying stones and,

ANOTHER CORNER, THE DECATUR EXHIBIT OPPOSITE TO WHICH WERE COMMERCE BEHIND THE PHOTOGRAPHER AND METZ ACROSS THE AISLE

TWO GROUPS OF HEAVIER TRUCKS: AT THE LEFT LAUTH-JUERGENS, ON THE RIGHT A PORTION OF THE WELL-BALANCED ATTERBURY DISPLAY

spring suspended, a starter was fitted, also a differential lock, odometer, governor for engine speed, transmission lower shaft extended for a winch attachment, and a special double lubrication system was employed.

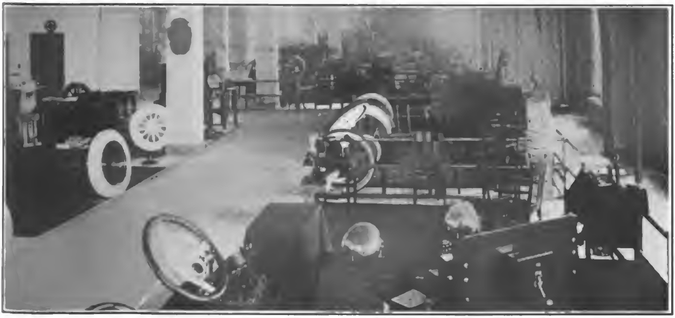
Walker, Walker Vehicle Company, Chicago.—This firm has succeeded the former Walker Balance Gear concern and equips all of its cars with that device, which consists in balancing the final drive by means of a pair of floating gears within the wheels. The power is electricity, wired to a motor incased in the rear axle housing. This drives the rear wheels through the gear just mentioned. A 750-pound chassis and light screen delivery were shown, also a 3000-pound panel body.

Walter, Walter Motor Truck Manufacturing Company, New York City.—Showed three cars, three-ton chassis, three-ton with warehouse body and five-ton chassis. The first named had a new form of transmission and was being operated continuously to show its merits. This is called a continuous torque unit from the fact that its construction permits changing from one speed to another without loss of torque or actual shift of gears. It contains a series of individual disc clutches, one for each speed—three forward and two reverse—by means of which the change is a continuous process, the motor picking up the load gradually. This chassis was notable also for the largest wheels in the building, measuring 48 by six inches.

MAIS REORGANIZED AND PROGRESSING

INDIANAPOLIS, Jan. 15.—A reorganization of the Mais Motor Truck Company of this city has taken place and a suit for receiver, brought recently by Harry S. Bloch of Wheeling, W. Va., has been dismissed by agreement in the Marion superior court. The company has increased its capitalization $75,000, and creditors of the concern have been given representation in the active management of the company by the creation of an executive board.

In the reorganization, W. H. Brown continues as president, J. V. Stimson, a hardwood lumber manufacturer of Huntingburg, has been elected vice-president, succeeding Albert Mais, who left the company several weeks ago. A. S. Lockard has been named secretary and treasurer, succeeding H. Moore, who acted in that capacity following the recent resignation of A. W. Markham.



A PORTION OF THE ACCESSORY DISPLAY ON THE SECOND FLOOR, INDICATING CHARACTER OF DECORATIONS AND SPACIOUS AISLES

Wagons and Horses For Sale

What Becomes of the Horses and Wagons?

With Special Reference to the Loss, If Any, Which a Merchant Must Stand in Adopting Motor Trucks

MANY progressive merchants are asking themselves the above question, in one form or another, with reference to modernizing their delivery facilities. Strange as it may seem, a large number offer the solution of this small problem as the really weighty factor in making the change. They say, look at the enormous loss I would have to stand if I changed my service, which is good enough anyhow, over to commercial vehicles. Laying aside the matter of "good enough" service, the question arises, is the loss so great? and what has it actually cost the progressive firms using trucks to make the change?

In order to prevent prospective buyers being scared away from the ideal method of delivery by this bugaboo, the COMMERCIAL VEHICLE has collected a large amount of information of this and closely allied subjects, which will be presented herewith and in later installments. In all of this data it will be noted that the installation of machines has been gradual. Like the telephone, typewriter, business phonograph and other up-to-date business aids, which have been tried out first and then added to as the condition of the work required it, the majority of firms using trucks have bought one or more at the outset.

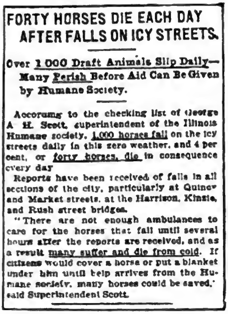
When the efficiency, reliability and, possibly, economy of these have been proven and business expansion necessitates more or better facilities, others have been purchased. A record of the purchases of almost any large user to-day will show the truth of this, the vehicles regardless of their total number having been purchased in from three or four to as many as 20 or more installments.

What it would cost actually to dispose of every horse and wagon, replacing an entire service with motor vehicles of various sizes fitted to the work, it is impossible to say, because to the writer's knowledge that has never been done. The closest approach to this are the two instances of Gimbel Brothers' department store and Peter Doelger's brewery, both in New York City. In the former instance, the new business started out with an entire equipment of vehicles, but later obtained the services of many horses for some short haul work. As to the latter case, it was the avowed intention of this firm a year ago to ultimately dispose of all horses in favor of electric trucks. The photograph below of this firm's yard showing the wagons for sale would indicate substantial progress in this direction, but even now a large number of the animals is in use.

In May, 1909, this firm purchased eight five-ton electrics, at which time it had in use 110 two-horse teams. Eighteen months later, Nov., 1910, the animals had been reduced to 65 teams, while an additional order for 16 trucks of the same capacity had been placed. Upon receipt of the last of these the wagons in the picture were placed on sale. Since then, however, more trucks have been purchased but still the firm uses a number of horses.

This experience is duplicated in the case of other breweries as well as other businesses. In Nov., 1910,

WHAT BECOMES OF THE WAGONS? SCENE IN THE YARD OF A PROMINENT BREWERY IN NEW YORK CITY, SHOWING WAGONS FOR SALE



FORTY HORSES DIE EACH DAY AFTER FALLS ON ICY STREETS.

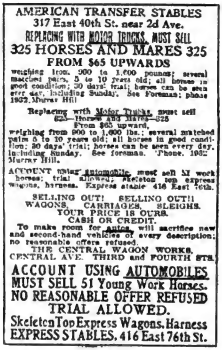
Over 1,000 Draft Animals Slip Daily—Many Perish Before Aid Can Be Given by Humane Society.

According to the checking list of George A. H. Scott, superintendent of the Illinois Humane society, 1,000 horses fall on the icy streets daily in this zero weather, and 4 per cent, or forty horses, die in consequence every day

Reports have been received of falls in all sections of the city, particularly at Quincy and Market streets, at the Harrison, Kinzie, and Rush street bridges.

"There are not enough ambulances to care for the horses that fall until several hours after the reports are received, and as a result many suffer and die from cold. If citizens would cover a horse or put a blanket under him until help arrives from the Humane society, many horses could be saved," said Superintendent Scott.

WHAT HAPPENS TO THE HORSES? NEWSPAPER CLIPPINGS INDICATING ONE THING



AMERICAN TRANSFER STABLES
317 East 40th St. near 2d Ave.
REPLACING WITH MOTOR TRUCKS, MUST SELL
325 HORSES AND MARES 325
FROM $65 UPWARDS

weighing from 900 to 1,600 pounds; several matched pairs, 5 to 10 years old; all horses in good condition; 30 days' trial; horses can be seen every day, including Sunday. See Foreman; phone 1932 Murray Hill

Replacing with Motor Trucks, must sell
325—Horses and Mares—325
From $65 upward,
weighing from 900 to 1,600 lbs.; several matched pairs 5 to 10 years old; all horses in good condition; 30 days' trial; horses can be seen every day, including Sunday. See foreman. 'Phone, 1932 Murray Hill.

ACCOUNT using automobile, must sell 51 work horses; trial allowed; skeleton top express wagons, harness. Express stable 416 East 76th.

SELLING OUT! SELLING OUT!!
WAGONS, CARRIAGES, SLEIGHS.
YOUR PRICE IS OURS.
CASH OR CREDIT.

To make room for autos, will sacrifice new and second-hand vehicles of every description; no reasonable offers refused.
THE CENTRAL WAGON WORKS,
CENTRAL AVE. THIRD and FOURTH STS.

ACCOUNT USING AUTOMOBILES
MUST SELL 51 Young Work Horses.
NO REASONABLE OFFER REFUSED
TRIAL ALLOWED.
Skeleton Top Express Wagons, Harness
EXPRESS STABLES, 416 East 76th St.

ADVERTISED SALES OF HORSES REPLACED BY MOTOR TRUCKS IN VARIOUS BUSINESSES

George Ehret, who brews 1,000,000 barrels and more of beer annually, had 28 electric trucks, two of them 10 years old and eight of which were built in his own shops. At that time the firm owned nearly 600 horses. On Jan. 1, 1912, 50 commercial cars of various sizes were in use and many more had been ordered, while the number of horses had only dwindled to 400 with an unfilled order placed for 60 more, making a total of 460. Thus practically doubling the motor wagons in a little over a year had only reduced the number of horses and wagons by 20 per cent. In fact, it is doubtful if it amounted to even that, because with more trucks and greater dependence upon them, the percentage of spare or extra horses kept in the stables was reduced materially so that the actual reduction in the case of the animals amounted to but slightly over 10 per cent. As each vehicle is doing the work of six horses, the total of 50 would seem to have replaced 300. Adding this to the number still in use, 460, and subtracting from the original number, about 600, it is seen that the business has grown the equivalent of 160 horses, or approximately 25 per cent. This has been assumed by the addition from time to time of motor wagons, the animals remaining stationary as to numbers.

It may be of interest to mention the fact that whereas this concern paid $900 a team last year and about $800 the year before, now the cost is close to $1000. This large increase in price makes the horses, which must be disposed of for any purpose or reason whatever, bring a good price. The specifications call for each animal to weigh more than 1900 pounds, from which a good idea may be gained of the character. Those sold for lameness, blindness or other reasons bring as low as $15 to $50, however, the usual buyers being farmers. The average loss on them is put down by the superintendent as 90 per cent. of the purchase price, while the number varies from 25 to 30 a year. This firm has never sold any wagons except when thrown on the scrap heap and disposed of as junk.

Geo. Ringler & Co., another New York brewer, has five big trucks all on long hauls and 65 horses used only on short runs. For the latter this firm pays from $900 a team upward and when obliged to sell gets less than $200, usually below $150. Cannot sell wagons at all, obliged to give them away; in fact, just before the writer's visit a lot of them were disposed of in this way. The number of horses now is about the same as three years ago before trucks were bought, but the business is larger and organized better.

In the case of department stores and the like, the animals are seldom disposed of but are moved farther and farther out as the delivery service grows, so that they always occupy the position of house to house distributors. Thus the larger stores, which formerly worked all wagons from the main stores, now have distributing stations at outlying points, from which the horses work. These are supplied by a motor service running out from the store on regular schedules. Besides these, the downtown deliveries have been increased in frequency say from three to eight or 10, and are made by motors as well—usually electrics. The worst problem of all, the bulky load to a far distant point, as for instance rugs or furniture from downtown New York to Tarrytown, N. Y., Bridgeport, Conn., Summit, N. J., or similarly located places calling for a two-horse team one entire day, if not longer, is easily solved. The light fast gasoline car slips out to one of these places and is back for more within three hours.

One great trouble with horses for city work exclusively, is that they soon get pavement sore, which renders them unfit for service. In that case they must be sold at a large loss, and, as this is a very common trouble, a remedy must be found. R. H. Macy & Co., a large metropolitan department store, has solved this nicely by sending such beasts to the farms owned by members of the firm and their friends. There, at no expense to them and during the dull season, the animals work on turf all of the time and usually recover. In Macy's case, nearly all of the horses are brought back to the city in the fall. In this way a dead loss of from $300 up for each of 50 or more horses is converted into no loss at all, the rested horses giving several years more service.

This particular firm has about 52 motor vehicles and from 500 to 600 horses in use, and states that it has experienced no loss whatever through the installation of the former, these being bought only to extend the business.

To give some idea of how this works out, two typical diagrams have been drawn for a radially disposed city. These, shown on the next two pages, show first the horse layout. In this, eight two-horse and two one-horse teams have been figured on. These are utilized with one exception within a three-mile radius from the store, all of the routes being planned so that two deliveries a day would not give a larger total than 14-16 miles, which experience has proven the animal's limit. It will be noted that only about 80 per cent. of the area within the three-mile circle is covered with a two-delivery-a-day service, while the two small sections beyond this radius have but single service. In the two most thickly populated areas, D and E, it is possible that the use of the extra two-horse team would increase the average of deliveries there to about three.

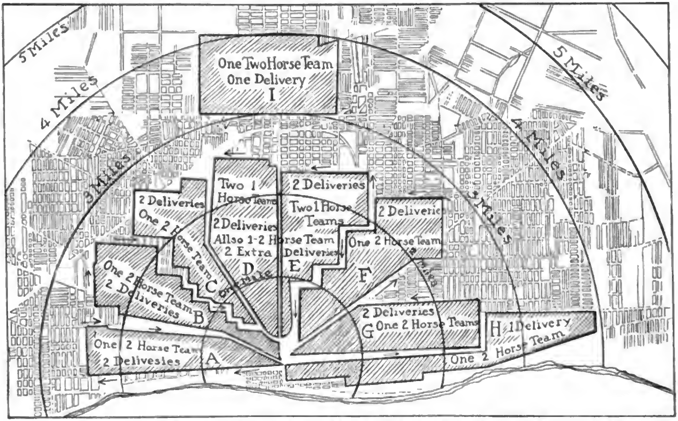
The second case shows the addition of only three motor vehicles, about as many as the ordinary store of this size would purchase for a starter, these being: One of 3000-pounds capacity and two of one ton. With this addition the alteration is made in that three outlying stations are established, two as it happens on the two-mile line and the other on the three-mile radius. That at the West has two two-horse teams working over areas which give about the same day's work for each as before. That at the East has three, one of which goes out into the suburbs for a single delivery only. From the North, three rigs work, one having two small areas, I, in which it makes two deliveries each morning for one, and one afternoon run over the other.

All of the area inside of these routes is covered from the main store, using the two 2000-pound trucks and the two one-horse wagons. These should give not only from four to six deliveries a day over all of this district, but, with the assistance of the distributing vehicle of 3000-pounds capacity, should make one trip across the river and one to the furthest north suburbs, as indicated on the map. The three trips daily to the sub-stations would only give the latter vehicle 39 miles a day without doubling up or approximately 33 by combining.

Looking closely at the last sketch, it will be seen that the service has been extended to include more than 80 per cent. of the district within the four-mile line, with two regular routes beyond this and extending over the five circle, in addition to one delivery across the river. This means that the area covered has been increased about 125 per cent., while the frequency of delivery has been doubled throughout the old territory by more efficient methods including the use of trucks and all of the former horses. This shows one of the places where horses and wagons go.

Another point which must be considered in appraising the value of horses and wagons actually disposed of lies in the annual depreciation carried against them on the books. If the horses have been carried at 25 per cent. a year for four years and are sold after that there is no actual loss. Again if they give five or six years' service, and their cost is charged off in four, when they are finally disposed of, the firm will actually be the gainer in two ways, the length of service overlapping the depreciation period and the price finally obtained for them.

In many Southern cities the truck situation is booming and the sale of either horses or wagons cuts little figure. In Louisville, for instance, a prominent dealer is quoted on this subject as follows: The horse and wagon investment in this town is immense and it would not be a good thing, from an economic standpoint, to force a sudden conversion from them to power-driven vehicles. The average owner, too, hesitates to make the change until he can afford practically to throw away his old equipment. He uses his horses until they are pretty nearly worn out —and incidentally that process is not a long one, consid-



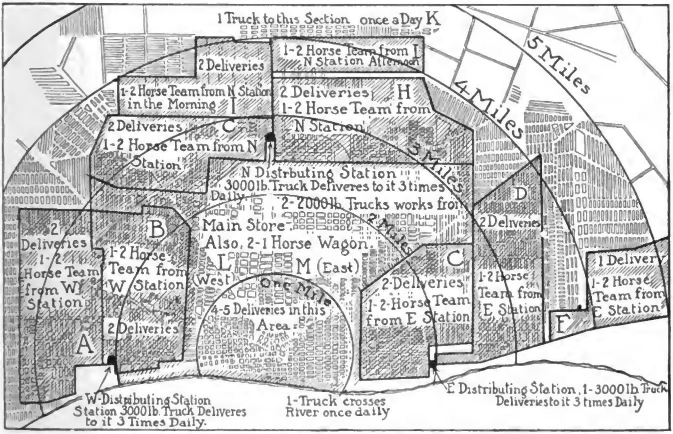
LAYOUT OF A RADIAL CITY SHOWING TYPICAL SMALL-HORSE DELIVERY SERVICE, ROUTES USED AND FREQUENCY OF DELIVERY IN EACH. NOTE PARTICULARLY THE SMALL AREA COVERED ering the pounding over city streets that the quadrupeds get—and the wagons are in a state which requires a good deal of money to be spent on them to make them serviceable. Then, when it is up to him either to replace the old horses and wagons or buy a motor truck, the latter is taken up and an investigation frequently results in the order being placed, especially if facts and figures have been compiled before and the cost of operating the two systems compared.

In my own experience the problem of getting rid of good equipment in the way of horses and wagons has never bobbed up. Sometimes trucks are installed when the business of a firm increases to such an extent as to make new equipment necessary. In that event, of course, the old is continued in use. In the case of a big ice cream company which has five of my cars in use, it is still running a lot of horses and wagons, and owns about as many of them as ever.

Other customers have old wagons standing under sheds waiting for use in an emergency—which seldom comes. The horses were not fit for further service and would have had to be replaced. The loss caused by the change, as far as the old equipment was concerned, was practically nil.

It is just as well from many standpoints that this method of handling the proposition should be used. It prevents a lot of antiquated equipment being thrown on the market and enables whatever scattering sales are made to be consummated at the top prices. It enables the truck to go into service on equal terms with the former equipment, and with no charge against it for loss due to a sacrifice of the horses and wagons. It makes the conversion gradual instead of sudden, and is best in the long run for the trade.

Another dealer who said that the disposal of horses and wagons sometimes had to be attended to described the situation as follows: Though some of our truck customers have discarded rather valuable equipment, in the way of horses and wagons, we never have been called on to assist in their disposal. The horse market is in good shape, and the supply seems, in spite of the large number of trucks now in service, to be smaller than the demand, so that there is no trouble involved in getting rid of a good team. Of course, if the horses or mules are in poor condition, they will not bring much, and accordingly the loss to the owner is not great. Wagons depreciate rather rapidly, as a rule, although many stand up for years. Sales can be made usually at a price which represents pretty accurately the value of the vehicle, and few sacrifices are made on this account. We have never been asked to take horses or wagons in trade, nor to help customers get rid of their old equipment.


1 Truck to this Section once a Day K
1-2 Horse Team from I N Station Afternoon
5 Miles
4 Miles
3 Miles
2 Miles
One Mile
2 Deliveries
1-2 Horse Team from N Station in the Morning I
2 Deliveries H
1-2 Horse Team from N Station
2 Deliveries G
1-2 Horse Team from N Station
N Distributing Station 3000 lb. Truck Deliveres to it 3 times Daily. 2-2000 lb. Trucks works from Main Store. Also, 2-1 Horse Wagon.
L (West)
M (East)
4-5 Deliveries in this Area
2 Deliveries 1-1 Horse Team from W Station
A
B
1-2 Horse Team from W Station
2 Deliveries
C
2 Deliveries
1-2 Horse Team from E Station
D
2 Deliveries
1-2 Horse Team from E Station
1 Delivery
1-2 Horse Team from F Station
F
W Distributing Station 3000 lb. Truck Deliveres to it 3 Times Daily.
1-Truck crosses River once daily
E Distributing Station, 1-3000 lb. Truck Deliveries to it 3 times Daily

THE SAME TOWN AND DELIVERY SERVICE WITH THREE MOTOR TRUCKS ADDED AND A DIFFERENT METHOD OF ROUTING FROM SUBSTATIONS. NOTE THE LARGE TERRITORY SERVED AND FREQUENCY OF DELIVERIES

It probably would be safe to assume three things in dealing with this problem. (1) That the substitution of trucks for horses and wagons will be so gradual as not to cause a demoralization of the horse market by the sudden offering of a larger number than could be absorbed; (2) that the average purchaser will not buy a truck until the possible loss due to conversion is at a minimum, so that the problem of getting rid of the old equipment will not be a pressing one; and (3) that horses and wagons always will be required to a certain degree, so that there will be an outlet for those pushed out.

(To be continued.)

Additional Detailed Specifications of Commer

AS was stated in the last issue, each year at this time the COMMERCIAL VEHICLE presents for its readers the specifications of all the cars on the American market for that year, these figures being compiled with great care and much accuracy from data supplied by the manufacturers themselves on specially prepared blanks. Since the latter have to be sent out several months previously, and each one checked, followed up and kept track of until the desired figures appear, the whole represents a large amount of fine work. These figures are presented on the following pages, and are as complete as possibly can be obtained. It will be noted even that a few concerns have been included which are now going through some sort of internal trouble. These were put in for the sake of completeness, the idea being that they would pass through the present difficulties and again place their product on the market later in the year.

Up to 1,000 Pounds:

CAR		BODY									POWER PLANT							
	Capacity	Length	Width	Overall Length	Overall Width	Wheelbase	Tread	Weight Chassis	Maximum Speed	Driver's Seat	Number Cylinders	How Cast	Bore	Stroke	Power	Carburetion	Ignition	Lubrication
Dispatch	600	48	36			96					2	Sep'rate	3.5	5.0		Schebler	Simms	In Fuel
Washington**	750	111	40			86	54	3,100										
Detroit	800	66	41	132	62	100	56		15	Behind	2	Sep'rate	4.0	4.0	16.0	Float		Force Feed
Dispatch	1,000	84	36			120					4	Sep'rate	3.5	5.0		Schebler	Simms	In Fuel
Ford	1,000					100					4	Block	3.7	4.0	22.5	Optional	Own	Splash
Fritchle**	1,000					96	54	2,200										
Herreshoff	1,000					100					4	Block	3.3	3.7	18.1	Stromberg	Optional	Splash
Landshaft	1,000	84	41			86					2	Sep'rate	5.0	4.7	20.0	Raymond		Force
Martin	1,000	60	39			94					2	Sep'rate	4.5	4.5	16.2			Force

1,001 to 2,000 Pounds:

CAR	Capacity	Length	Width	Overall Length	Overall Width	Wheelbase	Tread	Weight Chassis	Maximum Speed	Driver's Seat	Number Cylinders	How Cast	Bore	Stroke	Power	Carburetion	Ignition	Lubrication
Crewford	1,200					115					4	Block	4.1	4.7	27.3	Stromberg	Remy	Splash
Klinekar	1,250					86					2							Force
Dorris	1,500	68	44			132					4	Pairs	4.3	5.0	30.6	Stromberg	Bosch	Splash
Martin	1,500	72	41			94					2	Sep'rate	4.5	5.0	16.2			Force
Rassel	1,500	84	46			96	56				4		3.7	4.5			Magneto	Splash
Rowe	1,500	88	42			120					4	Pairs	4.2	5.0	28.9			Force
Washington**	1,500	132	50			90	56	3,200										
Buckeye	2,000						56	3,500	18		4	Block	4.1	4.5	35.0	Schebler		
Hewitt	2,000	92	30	156	65	94	60	2,800	24	Side	4	Block	3.2	3.7	17.0		Bosch	Splash
Landshaft	2,000	96	41			96					2	Sep'rate	5.0	5.0	20.0	Raymond	Remy	Force
Le Moon	2,000	96	48			127					4	Sep'rate	4.0	4.0	35.6	Rayfield	Bosch	Splash
Mack	2,000	84	48	192	68	126			20	Back	4	Pairs	4.5	5.5	32.4	Stromberg	J. S	Spl & P P
Martin	2,000	87	72			104					2	Sep'rate	4.5	5.5	16.2			
Rassel	2,000	96	46			96	56				4		4.0	4.5			Magneto	Splash
Van-L	2,000	132	46	144	56	118	56	2,200	18	Above	4	Pairs	4.0	4.2	30.0	Stromberg	Splitdorf	Splash

2,001 to 3,000 Pounds:

CAR	Capacity	Length	Width	Overall Length	Overall Width	Wheelbase	Tread	Weight Chassis	Maximum Speed	Driver's Seat	Number Cylinders	How Cast	Bore	Stroke	Power	Carburetion	Ignition	Lubrication
U. S	2,500	114	48	180	63	118	56.5	3,000	15	Above	4	Pairs	4.0	4.0	25.0	Schebler	Bosch	
Ven-L	2,500	178	168			130	56	3,000	16	Above	4	Block	4.5	4.5	30.0	Stromberg	Splitdorf	Splash
Washington**	2,500	141	52			96	58	4,100										
Bergdoll	2,600					115					4	Block	4.5	4.5	25.6	Mayer	Bosch	Splash
Dorris	3,000	113	67			138					4	Pairs	4.3	5.0	30.6	Stromberg	Bosch	Splash
Hewitt	3,000	102	60	186	65	160	60	3,000	22	Behind	4	Block	3.2	3.7	17.0		Bosch	Splash
Le Moon	3,000	120	65			132					4	Sep'rate	4.5	5.0	32.4	Rayfield	Bosch	Splash
Meck	3,000	93	48	192	68	126	58		18	Back	4	Pairs	4.5	5.5	32.4	Stromberg	J. S	Spl & P P
U. S.	4,000	141	72	232	73	144	62	5,600	15	Behind	4	Pairs	4.5	5.5	33.0	Float	Bosch	

3,001 to 6,000 Pounds:

CAR	Capacity	Length	Width	Overall Length	Overall Width	Wheelbase	Tread	Weight Chassis	Maximum Speed	Driver's Seat	Number Cylinders	How Cast	Bore	Stroke	Power	Carburetion	Ignition	Lubrication
Buckeye	4,000							4,200		Behind	4	Block			35.0			Spl & P P
Martin	4,000	108	48			138					4	Pairs	4.2	5.0	28.9			Force
Rassel	4,000	120	50			120	61				4		4.3	4.9			Magneto	Splash
Washington**	4,000	196				112	64	4,800										
Hewitt	5,000	144		198	78	136		4,900	12	Above	2	Sep'rate	5.5	5.0	24.0	Schebler	Bosch	Pump
Martin	6,000	144	60			138					4	Pairs	4.2	5.0	28.9			Force
Rassel	6,000	168	60			140	61				4		4.7	5.5			Magneto	Splash

6,001 to 10,000 Pounds:

CAR	Capacity	Length	Width	Overall Length	Overall Width	Wheelbase	Tread	Weight Chassis	Maximum Speed	Driver's Seat	Number Cylinders	How Cast	Bore	Stroke	Power	Carburetion	Ignition	Lubrication
Hewitt	7,000	144	78	198	84					Side	4	Pairs	4.2	6.0	40.0	Own	Bosch	Pump
Longest	8,000	144	72								4	Pairs	5.0	5.5	40.0	Stromberg		Splash
Mack	8,000				88	126	72		14	Above	4	Pairs	5.5	6.0	48.4	Own	J. S	Spl & P P
Hewitt	9,000	168	78	222	84					Side	4	Pairs	4.2	6.0	30.0	Own	Bosch	Pump
Rassel	10,000	168	72			140	66				4		5.0	6.0				M. Splash

Over 10,000 Pounds:

CAR	Capacity	Length	Width	Overall Length	Overall Width	Wheelbase	Tread	Weight Chassis	Maximum Speed	Driver's Seat	Number Cylinders	How Cast	Bore	Stroke	Power	Carburetion	Ignition	Lubrication
Hewitt	11,000	168		222	84	138	68		10	Side	4	Pairs	4.2	6.0	40.0	Own	Bosch	Pump
Hewitt	11,000	180	78	234	84					Side	4	Pairs	4.2	6.0	40.0	Own	Bosch	Pump
Mack	14,000					129	72			Above	4	Pairs	5.5	6.0	48.2	Own	J. S	Spl & P P

NOTES: **Electrics. *Forward. †Reverse.

All dimensions are given in the next largest even size. The weight refers to the chassis where this was available, but in some cases the total weight only was given, and this will be found in the table. Bore and stroke have been given in decimals except for metric sizes the fractions represented are as follows .1 represents 1-8, .2—1-4, .3—3-8, .6—5-8, .7—3-4 and .8—7-8. Under carburetion and ignition the make was given where this was available. Under Final Drive Ch repre-

cial Vehicles on American Market for 1912

Everyone is so busy at show time that it is a difficult matter to obtain the figures; engineers and factory heads are vitally interested in finishing the show chassis and bodies, too much so to bother with mere specifications. The indisputable value of the figures, however, warrants the publishers in keeping after the same until finally obtained. Just after the January number had gone to press a number were obtained, while the following week more came in.

With the object of rendering the tables the most complete compilation of this kind ever presented, the late ones are presented below. This is not in any sense a repetition of the previous figures, in part or whole; the editorial department of this publication has too many demands upon its time and space to warrant using either for mere useless repetition of already published matter. By uniting these two pages with the eight in the last issue a complete, accurate and reliable compilation of all makers in America, now turning out finished cars, will be had.

COOLING			TRANSMISSION				TIRES			SPRINGS			BRAKES			
Circulation	Radiator	Clutch	Form	Speeds	Location	Final Drive	Front	Rear	Front Axle	Front	Rear	Steering	Emergency	Service	Frame	Retail Price
Air		M.Disc	Friction	Any	Amidships	Chain	36x3	36x3	Tubular	Ell	Ell		Trans.	Int		$ 700
				4		Chain	30x2.5	30x2.5	Tubular	Ell	Plat		Hub	Hub	Arm-wood	1,675
Thermo	Tubular	Disc	Plan	2*2†	With Jacksh.	Shafts	32x2	32x2.5	Tubular	Semi-ell	Ell	Spur	J. S	Hub	Channel	740
Air		M.Disc	Friction	Any	Amidship	Chain	36x3.5	36x3.5	Tubular	Ell	Ell		Trans.	Int		900
Thermo	Tubular	M.Disc	Plan	2	U. M		30x3	30x3.5	I-beam							700
				6*2†		Chain	34x3.5	36x3.5		Ell	Ell	Opt	Hubs	Hub		2,000
Thermo	Tubular	M Disc	Select	3	Amidship	Shaft	32x3	32x3	I-beam	Semi-ell	Semi-ell		Int	Ext		950
Thermo	Tubular	M.Disc	Plan	2	U. M	Chain	34x2	36x2	Square	Semi-ell	Plat		Int	Int		950
		M.Disc	Plan	2			34x2.5	34x2.5	Round	Ell	Ell					1,400
Pump	Tubular	Cone	Select	3	Rear Axle	Shaft	34x3.5	34x4	I-beam	Semi-ell	Ell		Int	Ext		1,200
Thermo			Plan	2		Chain	36x3	36x3	Square	Semi-ell	Ell					1,250
Pump	Cellular	M Disc	Select	3	U. M	Shaft	34x4	34x4	I-beam	Semi-ell	Plat		Ext	Int		2,400
		M Disc	Plan	2			36x2.5	36x2.5	Round	Ell	Ell					1,400
		M Disc	Select	3		Chs	36x2.5	36x3	I beam	Semi-ell	Plat		Int	Ext	Pressed Steel	1,500
Pump	Cellular	M.Disc	Select	3	Amidship	Shaft	34x3.5	34x4	I beam	Semi-ell	Semi-ell			E&I		2,250
				4		Chain	32x3	32x3	Tubular	Ell	Plat		Hub	Hub	Arm wood	2,000
															Channel St	1,800
Pump	H'comb	Cone	Select	3	Jackshaft	Chs	36x3.5	36x4								1,800
Thermo	Tubular	M.Disc	Plan	2	U. M.	Chain	34x2.5	34x2.5	Square	Semi-ell	Plat		Int	Int		1,250
Pump	Tubular	M.Disc	Select	3	Jackshaft	Chain	36x3	36x3.5	I-beam					Trans.		2,000
Pump	H'comb	M.Disc	Select	3	Amidship	Chs	36x4	36x2.5 D	I-beam	Semi-ell	Plat		Hub	Hub	Pressed Steel	2,500
Force		M.Disc	Plan	2			36x3.5	36x3.5	Round	Ell	Plat					1,750
			Select	3			36x3	36x3.5	I-beam	Semi-ell	Plat		Int	Ext	Pressed Steel	1,700
Thermo	Cellular	Cone	Select	3	Shaft	Chs	36x3	40x3.5	Sheld	Semi-ell	Hub		Hub	J. S.	Chan. Iron	1,650
Pump		Cone	Ind.Cl.	3		Chs	34x3.5	36x4	I-beam	Semi-ell	Ell	Levigne	Hub	J. S.	Pressed Steel	2,250
Pump	Cellular	Cone	Select	3	Shaft	Chs	36x3.5	40x3.5	Sheld	Semi-ell	Plat	Ditwiler	Hub	J. S.	Chan. Iron	1,900
						Chain	32x3.5	32x3.5	Tubular	Ell	Plat		Hub	Hub	Arm-wood	2,300
Pump	Cellular	Cone	Select	3	U. M	Shaft	34x3.5	34x3.5	I-beam	Semi-ell	¾-ell		Int	Ext		1,500
Pump	Cellular	M.Disc	Select	Any	U. M	Chain	34x3.5	36x5	I-beam	Semi-ell	Semi-ell		Int	Ext		
Pump	H'comb	Cone	Select	3	Jackshaft	Chs	36x3.5	36x4								2,100
Pump	Tubular	M Disc	Select	3	U. M	Chain	36x3.5	36x4	I beam					Trans.		2,500
Pump	H'comb.	M Disc.	Select	3	Amidship	Chs	36x4	36x3. D	I beam	Semi-ell	Plat	Own	Hub	Hub	Pressed Steel	2,750
	Tubular	Cone	Clutch	3	Amidship	Chs	36x5	36x5	I beam	Semi-ell	Semi-ell	Levigne	Hub	J. S.	Channel	
																2,250
		M Disc	Select	3			36x4	40x5	Round	Semi-ell	Plat					3,000
			Select	3			36x4	36x5	I beam	Semi-ell	Plat		Int	Ext	Channel Steel	2,400
						Chain	34x5	34x5	Tubular	Ell	Plat		Hub	Hub	Channel	2,900
Thermo	H'comb.		Plan	2	Amidship	Chs	34x3.5	34x4								2,750
		M Disc	Select	3			36x4	40x3.5	Round	Semi-ell	Plat					3,500
			Select	3			36x5	36x4	I beam	Semi-ell	Plat		Int	Ext	Chan. Steel	3,400
Pump	H'comb		Select	3	Amidship	Chs	34x3.5	34x4								3,500
Pump	Tube	Cone	Select	4	Amidship	Chain	x4	x4	Solid				Int	Int		3,500
Pump	H'comb	Cone	Select	3	Amidship	Chs	36x5	34x4.5	Square	Semi-ell	Plat		Hubs	Hubs	Pressed Steel	4,250
Pump	H'comb		Select	3	Amidship	Chs	34x5									4,000
	Tubular		Select	4			40x6	40x5	I-beam	Semi-ell	Plat		Int	Ext	Chan. Steel	4,400
Pump	H'comb.		Plan	2	Amidship	Chs	36x4	36x5								4,500
Pump	H'comb.		Select	3	Amidship	Chs	40x5	40x6								4,500
Pump	H'comb	Cone	Select	3	Amidship	Chs	36x7	42x6	Square	Semi-ell	Plat	Own	Hubs	Band	Channel	

sents single chain and Chs double chain. Under the heading Frame, St stands for steel and the abbreviations P, Tub, A and Ch for Pressed, Tubular, Angle and Channel respectively. The prices will be found to vary in that a number of makers furnished the chassis price, a still larger number the retail selling price and some others the price F.O.B. factory.

The Trend of the Times in Truck Work

Some Suggestions to Both Manufacturer and User, the Adoption of Which Would Improve the Efficiency of Commercial Vehicles and Increase Their Economy, with Benefits to Both—Loading and Unloading Methods

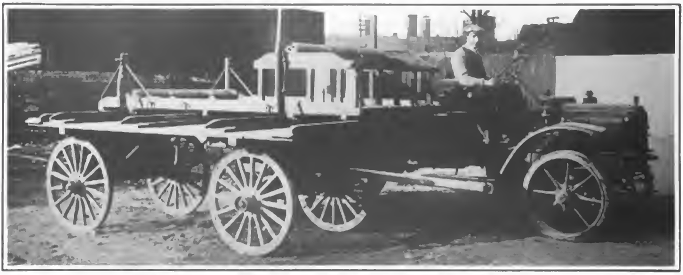
THAT the motor truck industry is well launched there can be no question, as we have advanced into that stage where the propaganda of preceding years is beginning to show fruit. The market for this class of product is at least in a receptive condition. We no longer have to agitate as to whether the machine is preferable to the animal or even the combination of an animal and rail freight haulage in suburban districts. We might even say that the prospective merchant user is seeking the truck producer and is keenly in quest of information on the subject at least. Some small fraction of the great mass of ultimate users have ventured to apply machines to their service. These are even the most progressive leaders of their respective communities; instinctively venturesome in the pursuit of commercial advantage.

The question before us as sober-minded observers of the transition taking place is whether the introduction of machines is being accomplished with such active efficiency of service as to stimulate rapid increase in their practically universal employment. Have the present users, progressive as they may be, entirely shaken off the barnacles of inherited customs, or have they divested themselves of that conservative prejudice in favor of what is, and has been, which handicaps their approach towards this new departure with an open-minded determination to give it a square deal?

It must be acknowledged that in most cases executives responsible for the initial employment of commercial cars are those whose aggressive superiority has secured for them their local positions of prominence. Nevertheless, that dominating assurance acquired with success in their own business often creates, unconsciously, the impediment of discrediting a corresponding or even superior success made by others in theirs. This is largely the condition we find at the present stage of motor truck application. The purchaser or user is frequently in the attitude of passive resistance to the persuasive efforts of the producer. There is an unconscious suspicion that the latter is not so successful with his product as his forethought, investment, patient development and forceful presentation justly qualify him to be.

The proof of the argument or prospective economy is enforced upon the seller, and the buyer enshrouds himself with a barrier of self-satisfaction which often postpones, if not entirely defeats, the advantages which he might otherwise gain. This may be common practice in the "marts of trade" to secure momentary concession or compromise to the advantage of the buyer as the result of barter; but its success is questionable in the introduction of industrial apparatus likely to reduce operating expense or induce economy on the part of the buyer.

It is certain that during the preliminary or introductory stages of any revolutionary or economic innovation the margin of price over cost must be high to equalize the extraordinary expense of marketing, and where the buyer may be smart enough to enforce a price or conditions upon the seller which deprives him of his sustenance during the more delicate period of his commercial progress, the former is very seldom the gainer in the end. Many of these "hard bargains," driven and conceded, are responsible for the impedimental wrecks which are more or less evident to any keen observer. On the contrary, how mutually gratifying are those cases where the purchaser has been mentally big enough to recognize in the



AUXILIARY LOADING LORRY WHICH REDUCES TRUCK TIME LOST IN WAITING FOR A LOAD AND INCREASES EFFICIENCY OF VEHICLE.

COAL, SAND, GRAVEL AND SIMILAR PRODUCTS ARE LOADED FROM ABOVE BY CHUTES. THE DUMPING BODY MAKES AN ECONOMICAL COMBINATION WITH THIS

producer those sterling qualifications which afford him the advantage of a hearty and intelligent co-operation and where the common problem of the efficient application of the machine to the particular case in question has been laid on the table for consideration as the vital issue. This is the kind of confidence that breeds success and assures from the start a successful progress from which there is no recession.

Of course, it may be said that the superficial conditions or indications encountered by the prospective buyer are not always such as to stimulate confidence, particularly where unusual expenditures are to be made. There may be questionable and hollow advertising, over-zealous salesmen; untrustworthy statements of marvelous performance and often a complete absence of fact. Nevertheless, the sensible inquisitor will go below this frothy surface, which is a common characteristic of any coming boom, and he will confidently expect and find reliable substance underlying the enterprise.

The capital and brains responsible for the production of commercial vehicles, and particularly large producers, are just as stable, dependable and perhaps more aggressive than will be found in most established lines of business. The obstacles encountered are many and sometimes, tedious in resistance, but that they are being gradually and efficiently mastered is quite evident upon the surface. The greatest difficulty of all is the ultimate application to maximum efficiency of service, and in the solution of this the user is of necessity an essential collaborator.

There can be no question that of all the problems of the past century transmission and transportation stand out at once as the most difficult and the most successfully developed. It is equally unquestionable that of the diverse subdivisions of the transportation problem that of vehicular transport is the most complex.

The magnitude of such an undertaking even in this transportataion age is somewhat embarrassing to contemplate. The difficulties to be overcome are innumerable; they are psychological, physical, financial, and in many minor details unfortunately indefinite. The latter is particularly aggravated by the conflicting variety of service to be performed and the unorganized efforts at work in uncertain attempts to solve each case by itself. The project is in sharp contrast with rail and water transportation, which have been handled effectively by the concentrated influence of well-organized institutions with enormous power, intellectually and financially. The results of this work are self-evident.

It is not too much to urge then, that if we are to start intelligently even there must be a mutual appreciation of the responsibility being almost equally divided between the user and the producer. All the intermediaries, whether they be salesmen, advertisers, clerks, drivers or delivery superintendents, are simply auxiliaries, and these two master minds must assume obligation for intelligent direction of their forces for the common purpose.

How largely the owner may be a contributing factor to the efficient application of the machine is not often apparent on the surface, and it seems to be one of the most difficult tasks to make the owner assume the obligation of solving his own transportation problem as well as he handles the difficulties encountered in other departments of his business. It is true, as stated before, that he often fails to rise out of the groove in which he has been accustomed to operate unless aided by the broader view of some

AUXILIARY WINCHES ARE FINDING A PLACE ON MANY VEHICLES. THIS SHOWS ONE USE—QUICK HOISTING

ROLLERS IN THE BOTTOM OF LUMBER TRUCK WHICH ALLOW QUICK UNLOADING

outsider, and it is in this latter function that the producer should furnish aid. The reluctance to a change in methods is not infrequently due to a mental indolence or even physical laziness, which is inexcusable. In many cases the task of applying an outfit of expensive machines scientifically is left to a sub-foreman or even the drivers themselves, whose inclinations are in many cases averse to the proprietor's best interests.

The numerous cases where the plaintive wail of the owner is heard against the machine and its apparent failings, while the same apparatus may be performing perfectly in the hands of his competitor, indicates where the real weakness exists. The process of spoon-feeding such delinquents with encouragement or suggestive remedies is often the tedious aftermath of a difficult sale, and it becomes a compulsory duty of the seller to eradicate the troublesome condition in view of its importance as a nuisance. Its influence as an impediment to local sales is serious and expensive, and such cases have been so prevalent as to enforce more cautious sales negotiations as a matter of self-preservation on part of the truck producer and as an everyday precaution.

Up to quite recently there have been a great many random and haphazard purchases, but as the more general adoption of the machine becomes apparent much more reason is being exercised to secure the greatest possible utility and consequent economy. The more complete the understanding of the requirements in each case, the greater is the assurance of a rational abstinence from machine installation where economy cannot be effected, or insurance that the anticipated benefits will be realized. To know when not to install machines is just as important to both parties as to apply them successfully, and a co-operative diagnosis with intelligent open-mindedness on each side is the safest course.

It is well known, particularly among the larger manufacturers, that most inquiries come from those horse users who have the most severe service, and often the only chance afforded for the introductory employment of machines is under such break-down conditions as to invite failure in advance, while the remainder of the horse installation might be superseded by machines with absolute assurance of satisfactory performance and substantial economy. There are also some lines of trade which seemed in the earlier days to be so very alluring to the neophyte manufacturer from the spectacular demonstration standpoint as to surfeit the prospective user with gratuitous service. This had its reflex action on the latter, who imposed test after test of increasing severity far beyond the bounds of any horse or other service they had ever been accustomed to or hoped to have, until the too-willing manufacturer finally collapsed without the slightest corresponding response in the way of remunerative purchases. This is perhaps more particularly true of the coal and wholesale grocery trades than elsewhere, and has resulted in the judicious avoidance of them by the more prudent manufacturers. Happily this spider-and-fly performance has subsided, and these trades are beginning to nibble at the bait with real money.

Along the same line of futile effort may be mentioned those cases where the prospective user, or rather the perspective user, is at present purchasing his horse service from a contractor and in the great majority of cases at such starvation prices as to keep the contractor on the ragged edge of existence. Of course, there is no legitimate intention on the part of these horse users to buy motor trucks. They have no investment in horse equipment, and are not likely to make voluntary investment in machines without some advantage, and this is usually impossible at existing horse prices. They like to tease, however, by endeavoring to persuade the motor truck manufacturer that he must come away down before he can compete with horses. This is a false condition and cannot

OVERHEAD LOADING WILL SOON BECOME A REGULAR METHOD WHEN ITS SAVING IS APPRECIATED last very long. This fool's paradise will soon disappear, for this very "sign of the times" is the one which foretells the doom of the horse contractor.

The unfortunate contracting teamster's present condition of servitude is brought about directly by the introduction of the motor truck and indirectly by a number of contributing causes which will presently appear. The motor truck purchases on the part of the contractor's best customers (to whom the superiority of service is priceless) have forced greater competition among them to get the remaining business, and this competition has so reduced prices that to hold onto those of his remaining customers, whose good name he cannot afford to lose without the prospect of immediate failure, the teamster is compelled to accept a figure which is below cost in the hope that he may be able to make up the loss elsewhere. Consequently, he becomes the prey of these second-class customers who have no investment at stake, who recognize the coming of the motor truck and who delight in enjoying the temporary advantage which, in his final struggle, the teamster is forced to give them. The other contributing causes to his distress are the increasing cost of feed and horses; the futility of endeavoring to maintain any rate agreement between contractors; the numerous contractors who have crept into the business from small beginnings and who always cause competitive irritation, and the final fact that he usually has no reserve capital to bridge difficulties or possibly redeem his situation by the purchase of motor vehicle equipment.

Thus it will be seen that at no very distant date the teaming contractor will have disappeared from the field of difficulties of the truck promoter, and it must be recognized that even though there are many cases where machines cannot be introduced at any saving of existing expense, the purchasing by the business man's competitor and the consequent more efficient service rendered will practically enforce the universal employment of machines in many cases irrespective of increased expense of operation. In other words, the machine becomes a necessary utensil in the performance of business, enforced by its employment for competitive advantage.

LOADING MAIL WAGONS BY CLOTH CHUTE AT ENORMOUS ECONOMY OF TIME AND MONEY

It is well known that transportation of structural material is largely done by contract, and has until the recent past been a very fruitful source of business to those leasing wagon service. However, a change is being brought about due to progress in the structure of buildings and other such projects, which enforces an intensity of effort remarkable even to the casual observer. We note that buildings practically grow up over night due to refinements in the preparation of the material employed. Steel beams drop into place without the slightest local alteration. Stone is cut elsewhere than on the premises and keeps even pace with the steel structure. Concrete is mixed by machinery in the yards, transported on the wagons in buckets and handled by derricks with a minimum of delay. It is no wonder then that those engaged in the supply of materials to new buildings which are not being operated under the refinements mentioned are worried to devise ways and means by which the expense of delays can be neutralized.

Almost every cement company, brick yard and lumber plant has now its traffic manager, and contracts are made upon the basis of schedule delivery of material. These traffic managers are acute in the matter of cost keeping and enforcing upon contractors a per-package cost of delivery whether it be cement in bags or bricks in loads. As a consequence a large percentage of the inquiries coming to truck manufacturers are from those interested in the handling of building material supplies, and with the horse contractors' prices whittled down to the lowest it is extremely difficult to make a reduction in existing

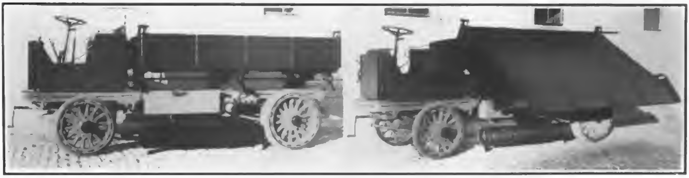
BOTTLED AND BARRELED GOODS ARE THE NEAREST APPROACH TO THE USE OF STANDARD SIZED PACKAGES AT PRESENT expense, or perhaps more particularly a reduction in the time necessary for loading and unloading both at the yards and at the building operation. This is compelling the commercial car producer to recommend and employ auxiliary apparatus for the loading and unloading of this material, such as winches, cranes, tilting bodies and other obvious devices. It will not be long before bricks, for instance, are picked up from the river barge by the truck crane in small crates, which are designed to fit the laborer's wheelbarrow at the building. The machine will be loaded in a fraction of the time at present necessary and unloaded with equal facility, the time consumed usually in delays at new buildings awaiting the superintendent's appearance for direction as to the position of unloading or receipt for the material delivered will be eliminated. It probably will become the practice of the material supply men in making their contracts to reserve a location at the building as a depot for the delivery and receipts of their material, this being in charge of a local man whose prime business it will be to minimize the machine's delay in making the delivery and check out the temporarily stored material to laborers as it may be required in the process of assembling the structural framing.

These problems are very intricate and equally interesting. They require concentrated study for solution, and are attracting the attention of the most qualified experts in both the motor truck and structural material businesses.

Another of the difficult situations confronting the truck producer in placing his apparatus to supersede horse service with reduction of cost is in the receipt and delivery of incoming and outgoing freight, where congestion, due to inadequate terminal facilities, makes apparent one of the most inefficient departments at present existing in railroad operation. The number of these terminals in large cities, together with the vast quantity of horse vehicles compelled to stand in line for from 50 to 80 per cent. of the working day, indicates a condition which is so unbearable as to force its solution just as soon as merchants begin to employ the motor truck more generally and are compelled to encounter this impediment.

One of the rational means of the general solution of this problem would seem to be the co-operative consideration of the difficulties jointly by the merchants and the railroad executives with such modification in the Interstate Commerce Commission law as would permit of the segregation of motor vehicles from horse vehicles, with provision for suitable handling apparatus at the truck platforms, which would at once confer an enormous advantage upon both the merchants and the railroads.

Even under the existing conditions it is apparent that, for instance, a wholesale grocer who may be employing, say five two-ton horse trucks, which are inactive six hours a day and during which time he is compelled to pay his drivers' expense, might reduce this materially by the employment of one 10-ton motor truck, requiring but one driver's pay. In this service 10-ton trucks certainly would be efficient, since their operation is very limited, the investment represented not being increased proportionately, and the suspension of operating expense during inactivity minimizes the cost to fixed charges, interest, a small depreciation and drivers' payroll. The utility of such a machine could be increased further by the employment of factory hand trucks in loading and unloading, these being kept on the merchant's loading platform and filled in the absence of the machine, thereby reducing the time and labor in loading the material into the truck and having a similar advantage at the other end in unloading, when the small truck may be wheeled to the freight car door. The latter operation might possibly necessitate the employment of a platform man at the merchant's expense, but this expenditure has the advantage of releasing the truck at the earliest moment with consequent efficiency.



DUMPING BODY WHICH ALLOWS OF QUICK UNLOADING FOR SAND, GRAVEL AND SIMILAR MATERIALS

Furthermore, any merchant having invested in such a machine would see to it that the truck left his premises on schedule time to take its place at the head of the line instead of waiting for the last moment or closing hour and being compelled to take the end of the line. It might be arranged even to handle these hand trucks at some distant part of the platform, to be transferred later to the proper place by the platform assistant.

There are numerous such schemes which are certain to be worked out just as soon as the responsibility for their development is placed upon the merchant, to whom the problem belongs as a matter of cost.

Department store service, with or without transfer to suburban depots, has already been very attractive to the motor truck producer, but anyone who will investigate keenly even the best of conditions which prevail at present will recognize that there is a large margin for improvements. Few of these department stores are handling the loading of their wagons scientifically. It is at present a time-consuming operation encumbered with difficulties due to past horse practices and from which it seems difficult to uproot the older men employed in these stores. While at the moment views from outsiders who may be expert at similar operations in other lines are resented, the time certainly is coming when packages will be loaded in the wagon almost automatically on a numerical system rather than a geographical one, which latter entails too much of the personal equation of the driver and too large a share of his time while the machine is being kept inactive.

Unfortunately, preconceived notions of the propositions are at present its greatest hindrances, but the employment of advanced methods on the part of some few, with a consequent competitive reaction, is bound to stimulate reactionary imitation, which in turn will compel the employment of machines to the complete exclusion of the horse.

Up to the present the department store situation has had a great number of peculiarities, and there has been a great deal of comment as to why some concerns still retain a mixed installation of a small proportion of machines and a large horse equipment. One of the answers to this is that the cash required for investment in the change is much more productive of return when employed in some of the quick turningover lines of the department store, where it is well known that capital is sometimes invested six times in a year at 8 per cent. return. Such transactions, of course, represent only a proportion of the business, and such high return is a necessity due to the losses in other lines, but when the management is confronted with the choice of utilizing ready cash capital this division of their business or in providing a complete machine equipment for transportation, the return in the latter case, while it may be large in the abstract, is small in proportion to the return when such cash may be employed in the manner described.

This fact has prevented a number of the more progressive houses from purchasing large fleets, in fact, it may be considered as an item which always will prevent to some extent large individual orders in this line.

BY LOADING ITS PRODUCT IN LARGE SIZED STANDARD BASKETS THIS BAKERY EFFECTS A MATERIAL ECONOMY IN DELIVERIES

MOSTLY PLEASURE CARS AT CINCINNATI

Cincinnati, Jan. 15.—Highly satisfactory and gratifying were the responses of the dealers in their applications for display space at the automobile show to be held in the north wing of Music Hall, Feb. 19 to 25, inclusive, under direction of the Cincinnati Automobile Dealers' Association.

All the available space was spoken for twice over, making it necessary to prune down at all points and allot room on the most equitable basis possible. The complete list of the exhibitors follows: Fischer Auto & Service Company, The Flat-Speedwell, Citizens' Motor Car Company, Packard; Olds-Oakland, Oldsmobile Oakland and R. C. H.; Leyman-Buick, Buick, Saurer and Mack trucks; Herscede Motor Car Company, Stoddard-Dayton and Rauch and Lang electrics; Kruse Motor Car Company, Marmon and Maxwell; Robert C. Crowthers, Alco and Elmore; Charles Behlen Sons Company, Locomobile, Detroit Electric; Frank H. Miller Sons, Stevens-Duryea; Charles Hannauer, Pierce-Arrow; W. C. Jungclas, Overland, Thomas; Cincinnati Automobile Company, Pope-Hartford, Peerless and Everitt; Charles Schlear Motor Company, Hupmobile and Interstate; Ford Motor Car Company, Ford; Helleman Auto Company, Haynes and Carter; Acme Automobile Company, Flanders, E.M.F. and American; J. H. Ratliff, Chalmers-Detroit, Stevens-Costello, Matheson and Stutz; Franklin Motor Car Company, Franklin; Dr. H. C. Wendall, Dorris; Payne Motor Car Company, Hudson 33; Haberer & Co., Cino; Imperial Motor Car Company, Stearn-Knight and Broc electric; Ohio Motor Car Company, Ohio; E. H. Jungclas, Detroit electric; Cadillac Motor Sales Company, Cadillac; Welland Auto Company, Columbus electric; Eddy Motor Car Company, Case; McFarland Auto Company, McFarland; Winton Motor Company, Winton Six; Mrs. S. B. Williams, Jackson; Schacht Motor Car Company, Sahacht; Brendamour Company, Babcock electric; Selden Motor Car Company, Selden; Harold-Reo Company, Premier and Reo; Ratterman & Luth, Krit; Carl Gildehaus, Cunningham; Chadwick company, Chadwick; Waverley company, Waverley electric.

Coughlin & Davis, automobile supplies; Moore Oil Company, oil; Bumiller-Remelin Company, accessories; Wayne Oil Tank & Pump Co. and Paragon Oil Co., oil.

PEORIA DISPLAY WELL ATTENDED

Peoria, Ill., Jan. 25.—The severely cold weather which marked the week of the Peoria Automobile Show in the Coliseum did not keep the people away, it being estimated that more than 30,000 attended during the four days. Seventy-two cars were sold outright, over 200 agencies were closed during the short time, while almost as much business has been done since, but exact figures are not available. One feature was the interest in commercials.

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WANTED—HIGH-GRADE SALESMEN

In the commercial vehicle industry all over the country there is arising a demand for high-grade salesmen. In this, an ordinary salesman will not suffice, nor will a man trained solely as an engineer; what is needed is men with some experience along both lines; men who are able to talk intelligently and with knowledge about ton-miles of haulage, cost a package, a ton and a ton-mile, long and short hauls, as well as analyze any transportation problem and recommend the best solution.

Each truck installation calls for slightly different treatment, and it requires a man of discernment and wisdom to note the slight distinctions between A's business and that of B, in order to suggest a somewhat altered method of handling the goods to compensate for this. Take for example the dry goods business and the haulage of department store products. While the majority of such houses have agreed upon the use of electrics for short hauls and downtown deliveries, with gasoline vehicles to carry goods to outlying supply and distribution stations, there are cases in which this combination would not be successful even in dry goods service.

The writer is familiar with a case of this sort in which an unwise manufacturer's salesman loaded a firm with a dozen wagons of 1,500 pounds capacity, the exigencies of whose work really only called for about six or seven, with the addition of two or three vehicles of twice that capacity. Sooner than see anything get away from him, the salesman urged the purchase of the 12 cars of his own make. Result, to-day this firm is desirous of disposing of the entire lot, and would not consider the purchase of any more bearing that name. They propose, when time and conditions are right for it, to get about 10 of 750 pounds capacity, two or three capable of handling a ton, and one or two of two-tons capacity. In connection with the present investment, calling for upward of $25,000, this firm is of the opinion that the maker with whom it did business formerly did not advise them to the best advantage. Another case of much greater import concerns a larger business, the adviser in that case specifying over 50 electric vehicles. These did not deliver satisfactory service, and later additions to the fleet have been almost exclusively of the gasoline type, for this concern is so situated as to have comparatively long hauls in many cases, besides which an unusual amount of out-of-town business calls for many suburban stations, and necessitates the last-named form to ply to and from the store.

Oftentimes the salesman will encounter a case where the merchant is seeking a high-grade installation, regardless of cost. In such instances, the suggested installation should include a number of vehicles of the very highest grade and of unusual external finish, despite which the sizes and powers may be selected so as to give the best result. On the other hand, many a sale calls for the exercise of considerable diplomacy to prevent the merchant from buying the very cheapest and, consequently, the poorest on the market. Each individual instance will require the exercise of good judgment, but this will be returned to him later with interest in the form of better position, higher salary, wider distinction and otherwise. It requires a good man and a strong one to pass his own car by in making the selection, but it will pay him and his firm better in the long run, providing he knows that the other vehicle will give superior results under those particular conditions. A number of truck salesmen's organizations all over the country are doing the industry much good in this direction by getting those stationed on the firing line together to discuss these matters of professional ethics and others.

TRUCKS AND MOVING PICTURES

Despite the wide and various uses to which the moving picture machine has been put as an educational medium, it seems to have escaped the attention of commercial vehicle advertising men as an excellent method of proving some of the truck's advantages over the horse. By taking a series of pictures on some icy, slippery or snowy day with horses sliding all over the streets and falling down to die or be injured, with a big delivery car slipping silently by in the background, going on with its work as efficiently as ever, many firms could be converted who are hard to reach at present. Such a method also would show at a glance the difference in speed and carrying capacity of the two forms of transportation.

EDITORIAL ANNOUNCEMENT

The management of the COMMERCIAL VEHICLE takes pleasure in announcing that C. C. McKinney, formerly advertising manager of *Power Wagon*, is now connected with this paper as Western advertising representative, with headquarters at 910 S. Michigan avenue, Chicago, as noted above.

Late News of the Month—Mostly Shows

Philadelphia's Part II Inaugurated Successfully—Boston's Big Dealers' Show Near at Hand—First in Rhode Island's Capital for Many Years—Notes of the Minor Circuit—Big Trade Changes

PHILADELPHIA, Jan. 23.—Part II. of Philadelphia's 11th annual automobile show was inaugurated yesterday when the gasoline pleasure cars surrendered the spotlight to the commercial car. As was the case during the initial week, the exhibition is being conducted simultaneously in the First Regiment armory, Broad and Callowhill streets, and the Third Regiment armory, Broad, between Federal and Wharton streets.

Perhaps more impressive than the display of pleasure cars has been the growth of the commercial vehicle division. This year's exhibition marks the first occasion in local automobile history that the mechanically propelled wagon needed the services of two buildings to display adequately the constantly increasing adaptability of the motor truck to almost every line of business in which rapid and economical transportation forms an important consideration. Consequently, the exposition of cars is the most comprehensive ever held in Philadelphia.

Thirty-seven separate makes are represented, divided, 13 at the First Regiment building and 25 at the Third Regiment structure.

Owing to delay in the arrival of exhibits that featured the Madison Square Garden show, it was well toward this evening before the full quota of cars was installed.

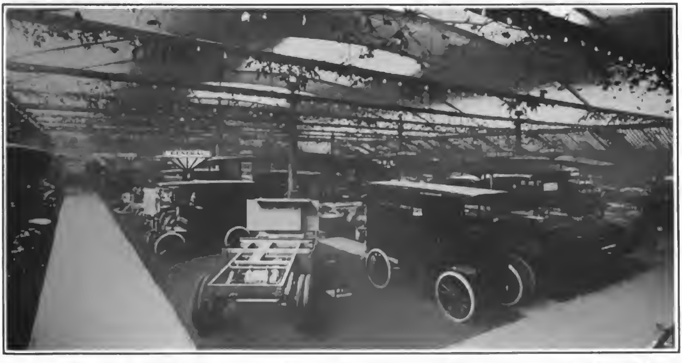
Briefly, the commercial car exhibition is as different from the one it displaced as two things could be. Not as spectacular as the preceding week, the exhibition suffers nothing by comparison. Its success is just as pronounced. It is distinctively a business man's show, and as such is attracting the man who expects to profit by his visit and incidentally save money in the delivery system of the house he represents. The mere sightseer is conspicuous by his absence, the buyer or the prospect predominating.

Business houses will have separate days set aside for their interests—manufacturers, storekeepers, brewers, merchants and all lines of trade, wherein the motor-propelled car, no matter of what type, can facilitate the collection and delivery of wares, all will be catered to and shown how to improve their service and at the same time reduce the outlay.

The number and variety of cars shown are locally without a parallel, the array including motor-driven cars ranging from tiny runabouts and light delivery wagons to seven-ton trucks, included between the extremes being all sizes and types adaptable to every kind of work and all weather conditions.

At the First Regiment armory are shown the Autocar, Brush, Kelly, Mercury, Morgan, Speedwell, Seitz, Sandusky, Peerless, Gramm, G.M.C., Commer and Cartecar.

The display at the Third Regiment, which is confined



GENERAL VIEW OF THE COMMERCIAL SECTION OF PHILADELPHIA DISPLAY, SHOWING G V ELECTRICS PROMINENT IN THE FOREGROUND to gasoline trucks, comprises the following: Alco, Alden-Sampson, Baker, Chase, Cameron, Commercial, Detroit, Ford, Garford, General, Kisselkar, Knox, Locomobile, Lozier, Mack, Mais, Packard, Philadelphia, Pierce-Arrow, Pope-Hartford, Reo, Saurer, Walker, Waverley and White.

At the Third Regiment is also an attractive showing of the most notable and useful accessories.

Trucks Have Initial Separate Week at Boston

FOLLOWING as they do the great automobile exhibitions recently held in New York City, the Boston Shows, to be held in Mechanics' Building, the pleasure car exhibition from March 2-9, inclusive, and the commercial vehicle show from March 13-20, inclusive, promise to surpass anything of the character ever held in this country. Great as were the New York shows, the Boston exhibitions will be still greater, for all the big exhibits which created such a sensation in the metropolis will be shown in Boston, together with many others which did not exhibit in New York. The pleasure car show will embody the very latest ideas in design and construction with that refinement and simplicity towards which the automobile engineers have been working during the past few years. The various styles of self-starting devices and equipment for cars will be demonstrated at the show, while the new six-cylinder cars of various makes will hold a prominent place among the exhibitors. Practically every inch of space has been taken and the exhibition promises to be a revelation.

For the first year the Boston Commercial Motor Vehicle Association will hold a separate show, and Mechanics' Building has proven hardly large enough to house the many splendid exhibits of commercial and utility vehicles. Every one connected with the business life of New England should visit this structure during the wonderful exposition of the phenomenal progress that has been made in the development of the motor driven vehicle. There will be wagons and trucks of every description and for every business, and some of the great five and six-ton trucks are bound to create a sensation. It hardly is necessary at this time to analyze or go into detail regarding the many and varied exhibits which will be found at the commercial vehicle show. There will be great tank wagons for carrying oil, big massive coal carrying trucks, fire apparatus, carts and vehicles for municipal uses, undertakers' wagons and hearses, army transports for field work, ambulances, light and natty delivery wagons, designed especially to suit the character of the goods to be carried, and wagons with extra nests or detachable bodies which can be loaded and ready to slip into place when the motor truck returns from a trip, will be among some of the novelties to be shown. New ideas in transmission systems, lubricating devices and general construction will be found in many of the exhibits. The show will be a tremendous object lesson and the business man will recognize the value of its economic side, to say nothing of the value in service that can be commanded by the use of the motor vehicle.

With two separate shows this year more satisfactory results can be realized for both exhibitor and spectator, and the result should be that Boston will hold this year the two greatest automobile exhibitions ever held. in this or any other country. Manager Chester I. Campbell will do his full share towards making the shows more than just exhibitions of motor vehicles, for he will contribute many features that will add to the enjoyment and pleasure of the thousands of visitors not connected directly with the automobile industry or owners of cars. The pleasure car show will have its social side, as will also the truck display, while charming music will enliven matters during the exhibitions. Manager Campbell will spend thousands of dollars to beautify and decorate Mechanics' Building properly for the shows.

Rhode Island Dealers' Show Includes Trucks

AUTOMOBILE trucks and equipment, so far as their use for show purposes is concerned, come into their own in Rhode Island at the show to be held by the Rhode Island Licensed Automobile Dealers' Association in the State Armory during the week of January 22. This is the first show ever held by the association, and it will be one of the most complete ever held in the state. The entire basement of the great armory has been reserved almost exclusively for commercial automobiles, and nearly every style of vehicle used in commercial activities will be displayed there, including light delivery wagons, light and heavy trucks, as well as many special pieces of apparatus, ambulances and fire-fighting automobiles

The two previous shows held in Rhode Island were managed by individuals in a private capacity, but practically every dealer in the state is a member of the licensed dealers' association, and all will be represented. Rapid strides have been made by motor truck dealers in the past few years in Rhode Island, and the display in the commercial department will be a revelation, both in arrangement and completeness. An artistic scheme of decoration has been followed in this department, which promises to be one of the most attractive of the show.

Entries up to a week before the opening of the show included the American Locomotive Company, Gramm, Pierce-Arrow, Pope-Hartford, Kissel Kar, Chase, Morgan, Elmore, Teel-Woodworth, Knox and White trucks. A number of other trucks are expected to be entered before the show.

(Special Telegram)

PROVIDENCE, Jan. 23.—While representing the most complete display of commercial vehicles ever given in this city at the Automobile Show, which opened last night, special fire, police and ambulance apparatus was lacking as well as special truck bodies. The majority of the manufacturers showed standard forms or chassis.

Among the new exhibitors, the Teel Mfg. Co., Medford, Mass., was notable as showing the only entirely new vehicle. This firm had on exhibition two Teel-Woodworth trucks designed solely for economical conveyance of freight, the designer's 10 years' experience being in freight-carrying vehicles. The factory has been turning out trucks since last June, seven now being in use in Providence. The two exhibited are of the three-ton size, both being equipped with Continental motors, Timken axles and Cotta selective transmission.

Among the larger commercial cars was noted a three-ton brewery truck of the Pope-Hartford make which was exhibited by the Rhode Island Motor Car Company, three Alco trucks of 2, 3.5 and 5-ton capacity, while the largest exhibitor was Alvan T. Fuller, showing five Packards.

A complete list of exhibitors, with the name and number of vehicles, is as follows:

American Locomotive Company, Alco, two, 3.5 and 5-ton trucks; Hitchcock Banks Motor Car Company, Knox, two trucks; Wm. Hughes Company, Reo, two trucks; Alvan T. Fuller, Packard, five; Autocar Service Company, Autocar, three trucks; Davis Auto Company, Gramm, three; Foss Hughes Motor Car Company, Pierce-Arrow, one truck; Kissel-Car Company, Kissel, four; Pugh Bros., Morgan, one truck; North End Garage, Chase, one; White, Binford & Robinson, White, three trucks; R. I. Motor Car Company, Pope-Hartford, one; C. H. Goodwin, Interstate, two trucks; Teel Mfg. Company, Teel-Woodworth, two trucks, making a total for the show of 30 commercial vehicles.

Milwaukee Show Most Comprehensive

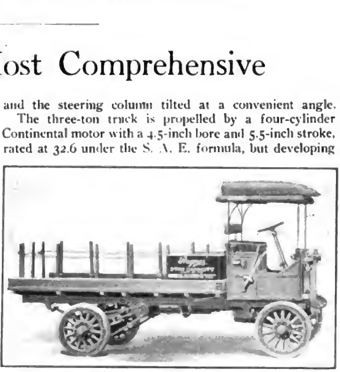
MILWAUKEE, Jan. 23.—Forty-seven commercial vehicles, representing 20 distinct makes, were shown at the fourth annual Milwaukee show in the Auditorium, January 13 to 19. It was the most comprehensive exhibit ever made here and occupied the entire basement floor. There were seven newcomers this year, the following makes never before having been exhibited here: Pierce-Arrow, White, Chase, United States, Peerless, Menominee and Progress. The last-named is the latest product, being built by the Universal Machinery Company, of this city.

The organization of the Wisconsin Commercial Car Association was a result of the show. Seventy-four delegates, representing 40 manufacturers and state agents, were represented. Officers were elected as follows: F. Brandeker, Kissel Motor Car Company, Hartford, President; S. Wolheim, Crown Commercial Car Company, Milwaukee, vice-president; C. G. Anderson, Stegeman Motor Company, Milwaukee, secretary and treasurer; directors, D. F. Poyer, Menominee, Mich; E. L. Cochrane, Packard Motor Company, Milwaukee Branch, and E. C. Devlin, Universal Machinery Company, president. It is proposed to promote an educational campaign.

It was a natural consequence that a manufacturing company which has been making parts for commercial vehicle builders for many years should eventually produce its own complete product, and that is the evolution of the Progress line now built by the Universal Machinery Co., which has a large and well-equipped plant at 19th street and St. Paul avenue, Milwaukee, and a solid and substantial financial backing, in which the Franzen estate is a part.

The three-ton vehicle was the only one shown at the Milwaukee show by the Universal Machinery Company, it having been found impossible to complete any of the 15-ton models in time for the exposition. This is a sturdy type and built to carry a large overload. In one test, successfully negotiated, it carried a load of exactly 9750 pounds and made a 100-mile run in nine hours forty-three minutes. Both models are of the motor-under-the-floorboard type, the seat being directly behind and the steering column tilted at a convenient angle.

The three-ton truck is propelled by a four-cylinder Continental motor with a 4.5-inch bore and 5.5-inch stroke, rated at 32.6 under the S. A. E. formula, but developing a much greater horsepower because of its sturdy design and long stroke. The cylinders are cast in pairs and are of the L-head type, with the valves on the left side and fully inclosed. Ignition is derived from a Mea magneto of the latest sliding type, with battery for starting and auxiliary. The spark control is under the steering wheel opposite the throttle control. A Stromberg type B carbureter is used and in connection therewith is an ingenious governor device limiting the speed to 12 miles.



PROGRESS TRUCK SEEN FOR FIRST TIME AT MILWAUKEE

The Menominee light delivery truck is the product of the D. F. Poyer & Co. factory at Menominee, Mich., the twin city of Marinette, Wis. This concern has been in the garage and machine shop business for more than 10 years and four years ago began experimenting with light commercial vehicles built in its own shops.

The Menominee is built in one chassis, listing at $1,200 equipped with open express body. Any style of body is built to order, from a stake platform body to a hotel omnibus or brewery car. The average capacity is 1500 pounds, but this is increased to a full ton in various body types, as the car is built for a full 2000-pound capacity.

Engineers' Annual Meeting Noteworthy

Large Attendance and Much Enthusiasm Mark Eighth Yearly Gathering of Society of Automobile Engineers—Progress Made in Standardization—Henry F. Donaldson Elected President

CLOSING just a few hours previous to the end of Madison Square Garden's second or truck week, the annual gathering of the members of the Society of Automobile Engineers came to an end in New York City, Jan. 20. This was the best from point of attendance and interest ever held, although the registration showed but 360 names, somewhat less than at Dayton, last summer. The sessions were held in the Assembly Room of the Garden, except the dinner, which took place Jan. 19 in the Belvedere Room at the Hotel Astor.

The session was opened on Thursday morning with an address by President Henry Souther, who outlined the work of the various committees and spoke very flattering of the society's future. The total membership is about 1200, it being about twice the enrollment at this time a year ago, according to Mr. Souther's figures.

Coming, as it did, in conjunction with the commercial section of the Garden Show, there was very little outside entertainment planned, and the time was largely taken up by professional subjects. Following the president's opening address, the accumulated business matters were first disposed of, after which the real work of the session was begun, 19 papers and the reports of some 10 committees being read and fully discussed before it was finally brought to a close on Saturday.

HENRY F. DONALDSON,
President S. A. E.

The chief matters under consideration were the address of President Souther, covering the work of the society during the past year, and the election of officers, wherein Henry F. Donaldson was chosen president to succeed Mr. Souther. The professional session included the submission and acceptance of three reports and the submission and partial debate of a fourth, final action upon which was deferred until Thursday afternoon.

The meeting opened without ceremony, President Souther plunging into his report at once. Among other things, he said:

> In January, 1911, we had 614 members; in June, 1911, we had 899, and at the present time we have a membership of 1200. These figures include membership of all grades, full members, associates and juniors. We also have a few affiliated members, that is corporations which have joined since the constitutional amendment providing for such grade was passed last June.
>
> It is my opinion, and the opinion of the council and of those most familiar with the possibilities before the society, that the membership is not being increased too rapidly and that the society is not attempting to embrace members whose qualifications are too far from those of the strictly automobile engineer. It is my opinion that there is room for both classes of effort, that is pure engineering and manufacturing in all their phases.
>
> The work of the Standards Committee has progressed as rapidly as is safe. There has been much time given to the work of the various divisions by many members whose time is very valuable. The results still pending on some lines of work are being expectantly awaited by our members and the automobile industry in general.
>
> The Truck Standards division has been formed since our last meeting. It is important to note that the formation of the division is during the early history of extensive truck manufacture. There is no time so favorable for the adoption of a standard as in the beginning of an industry. During the early history of any industry there is less difficulty in establishing a standard than later, for the simple reason that there is less to undo. A young industry has not set up many standards of its own that it would cost a great deal to change. On the other hand, there is not sufficient data available to establish many standards. Neither engineer nor factory manager knows enough to select that which is just right. Nevertheless, it is apparent that there are some things in connection with truck manufacture that can be standardized now just as well as later, and the function of this division is to establish standards and to continue adding to these standards just as fast as it is safe to do so.

Treasurer A. H. Whiting reported that the organization was in flourishing condition financially. His report covering the last three months of 1911 showed that the receipts had been $11,383.14 and the expenditures were $9,350.45. The balance, including the balance of Oct. 1, was over $2,300.

The election of officers was practically unanimous, the following being chosen: H. F. Donaldson, president; H. W. Alden, first vice-president; H. L. Pope, second vice-president; H. F. Cuntz, treasurer. Council members to serve two years are: C. B. Whittlesey, A. B. Cumner and A. L. Riker.

When the chairman finished reading the report on Iron and Steel Specifications, President-elect Donaldson having been called to take the chair, it seemed as if it was about to be adopted without discussion, but gradually the membership woke up to the importance of the report and for over one hour a continuous fire of remarks, comments and explanations enlivened the proceedings. After a prolonged discussion pro and con the report was unanimously accepted.

Next in order was the report of T. V. Buckwalter, as chairman of Sheet Metals division, on the non-ferrous alloys for sheets, rods and tubes. This did not provoke much discusison and was unanimously adopted. Others accepted during this session were Buckwalter's on metal gauges, ball and roller bearings by David Fergusson, and in the afternoon no reports were presented. This meeting was devoted to the reading of papers, those presented being First European Visit of the Society, H. M. Donaldson; Worm and Gear Drive, R. H. Rosenberg: Non-Poppet Valve Motors, J. B. Hill, and Silent Chains, C. S. Ricker. The writers of papers on Wood Wheels and Wire *vs.* Wood Wheels were not present but several letters on these subjects were read and discussed.

At the Thursday evening gathering, different phases of the commercial vehicle situation were presented and argued. Charles B. Whittelsey opened the discussion by reading his paper on the Mechanical Points in Connection with the Construction of Solid Motor Tires. He brought out the fact that solid motor tires can wear away and suffer as much from misuse as pneumatic tires, and stated further that the misuse to which they are put generally is largely due to the fault of the manufacturers in not educating users to an appreciation of the tremendous difficulties that have been surmounted in bringing them to their present state of efficiency.

A paper which dealt with Increasing of the Utility of Commercial Cars by Auxiliary Loading and Unloading Devices was read by its author, E. W. Curtis, Jr. He stated that, with the increasing sale of motor trucks, the demand for auxiliary loading and unloading devices has developed a variety of contrivances good, bad and indifferent, which are to be obtained readily all over the country. In his opinion, however, expert discrimination is generally required correctly to select and adapt the proper vehicle to the work in hand. The uses to which dumping bodies, quick loading hoppers, cranes and the like are put in large commercial organizations were mentioned. In his conclusion he said that the employment of new devices and new uses for the ones now extant will unquestionably increase the utility and sale of motor trucks, and should be given all the publicity possible. There is excellent opportunity for the ingenious engineer who will devise new means of loading or unloading truck merchandise and he should have in mind that the power plant of the truck may be utilized to good advantage.

The paper prepared by E. P. Batzell on Motors and Transmissions for Commercial Cars was not read, although Mr. Souther talked on a few of the salient points. This provoked considerable general discussion of features needed on trucks, following which the reports of W. P. Kennedy were read by proxy, he being ill. The first was of the Committee on Standards Recommendations, the second Wheel Dimensions and Fastenings for Tires. Several articles dealing with the recent foreign trip were delivered, the first being Marketing and Use of Light Gasoline Vehicles in Europe, by A. B. Cumner, and the second, the Trend of English Design, B. B. Bachman. The concluding paper was that on Steel Wheels, by A. J. Slade, referring more particularly to conditions abroad.

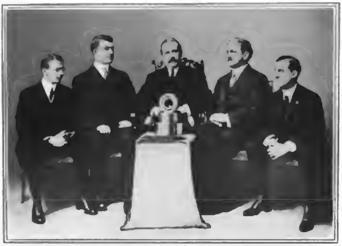
Practically all of the Friday morning session was given over to the report of the Miscellaneous division, presented by Morris A. Hall, Chairman Riker being ill. The work of this branch dealt with gasoline tanks, for which a safety valve was recommended to avoid adverse legislation; magneto dimensions, a standard set being presented—these were discussed by Mr. Moscovics; electric lighting outfit dimensions; bushings for rod and yoke ends and spark plug tolerances. A paper by Mr. Moscovics on the Magneto in Relation to Engine Design closed the session.

In the afternoon, following several papers on various subjects, the Broaches division presented its second report, in which six questions were propounded and discussed.

At the banquet that evening past president Souther acted as chairman. He reviewed briefly the work of the engineers, and in particular the past year. He then introduced H. F. Donaldson, president-elect, who spoke on the European visit, presenting many interesting and humorous incidents. He was followed by E. T. Birdsall, who spoke on the early days of the society. Other speakers were: H. M. Lloyd, F. R. Hutton, T. C. Pellinger, representing the Arrol-Johnston (Scotch) firm and H. C. McCormick of the Wolseley-Siddeley (English) Company.

The program for Saturday morning, the windup, was as follows, this being followed closely, except that the papers were not read entirely, each author confining himself to giving a summary so as to economize time:

The Balance of Automobile Motors, paper by E. R. Fried; Starters for Gas Engines, paper by J. W. Fitzgerald; Report of Broaches Division; Report of Carbureter Division; Report of Springs Division, A. C. Bergmann, chairman. Report of the Frame Section, Report of the Springs Division, Details and Peculiarities of Design in Foreign Cars, paper by W. G. Wall.



NEW DEPARTURE SALES FORCES; LEFT TO RIGHT, MESSRS. JENNINGS, HUGHES, PAGE, DUSINBERRE AND IDE

THE NEW DEPARTURE SALES QUINTETTE

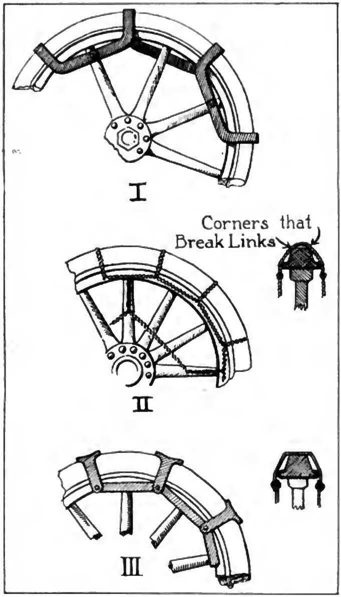
The gentlemen shown in the illustration above comprise the sales and engineering forces of the New Departure Mfg. Co., Bristol, Conn., who were responsible for the extensive exhibit of bearings which was one of the interesting features of the Madison Square show.

DeWitt Page, secretary and sales manager, has been with the company for more than 20 years, and has probably planned and carried out more exhibitions in the Garden than any other exhibitor at this last show. Mr. Dusinberre is in charge of the Detroit office, assisted by Mr. Ide. Frederick R. Hughes is chief of the engineering staff and Mr. Jennings is his assistant. The quintette will be in attendance at the Chicago show, establishing headquarters at Suite J, Rooms 1, 2 and 4, Congress Hotel Annex, where they will be glad to welcome the trade with characteristic New Departure courtesy. A few of the ball bearing stick pins such as were given out at New York have been made up for distribution to Chicago visitors.

The Necessity for Non-Skidding Devices

Brief Mention of Weather and Road Conditions Which Call for Some Method of Avoiding Slippage—Present Available Forms

EASILY the most dangerous thing about motor trucking work in the winter time is the matter of losses through slipping and skidding on city pavements. Where there is not sufficient traction to give the tires a grip upon the road surface, the vehicle will be at a standstill or practically so until the surface of one or both is altered in some manner. The pavement can be changed only by the use of sand, gravel, ashes or similar material. These seldom are available. The tires, on the other hand, may be altered only by the addition of something which will give a grip on snow or ice. The matter of skidding, which is important on ordinary wet surfaces, becomes doubly so on ice or hard packed snow. In the latter instance the effect of skidding will be to increase largely the danger therefrom.



FIGS. 1, 2 AND 3—THREE FORMS OF NON-SKIDDING DEVICES WHICH HAVE BEEN TRIED WITH MORE OR LESS SUCCESS

In Northern cities, where zero and low temperatures are frequent during the winter months, this problem assumes a more serious aspect than in places further south, where snow and ice are infrequent. In the city of New York, particularly, the operators of large fleets would like to know what to use and where to obtain it, for the traffic congestion of the metropolis makes both slipping and skidding more dangerous and much more expensive than in smaller cities. Recently after a heavy snowfall in New York the man who has charge of Gimbel Brothers' large fleet, when asked if he could leave for a short time, replied that it would be impossible, as he expected to tow in two or three smashed cars before night. The reason for this lay in the fact that none was equipped with non-skids. The firm would like to apply these, but hesitated at a greater daily cost than that of either gasoline or electric current.

One large factor in city service is the presence of numerous car tracks. In cold weather crossing these will affect the steel in the non-skid chains unfavorably. If the links are made of sufficient cross-section to withstand this cutting action, wheels, axles, springs and bearings will have to be made heavier to survive the additional vibration.

It may have been noticed that the driving chains on many cars come very close to the inner edge of the wheels, that is to say there is a very small amount of clearance at this point. From this arises the need for a device which will stay very close to the tire, as anything which does not is liable to get under the driving chain and break it. The most successful form of this kind consists of flat bars of steel which cross the tire surface at right angles and have ends parallel to it which are used to bolt it together. One of these is shown in Fig. 1. The writer has tried out about a dozen sets of these, but on one car it was necessary to change the rims; on another a few spokes had to be replaced. Still another car came in without fenders broken off by the flying bars, while other smaller troubles were too numerous to mention. The greater portion of this trouble was experienced in Minneapolis and St. Paul, where during February the ice and snow in the streets are from six to eight inches thick. After a snowstorm the traction is so poor that in pulling out of car tracks or crossing over them something was broken or pulled apart almost every time.

In going up some of the steep hills for which St. Paul is famous the wheels would spin around even with chains in place. This seems to demonstrate the necessity for a thicker edge than the ordinary pleasure car chain presents. This may be noted by comparing Figs. 2 and 3, the former showing the narrow-edged chain and the latter one which was constructed for Northwestern use. When made strong enough to stand the abuse these were too heavy. They would imbed themselves in the soft surface rubber of the tire, but gave fair satisfaction otherwise.

Following this a large number of experiments were tried; these including the use of bands, elevator cable and various forms and sizes of chains. The ultimate form arrived at was that shown in Fig. 4, which was satisfactory in every respect except first cost. This consists of a series of bands, H, around the tire at intervals and attached to a U-shaped clip on the under side of the felloe, but held away from it by a small coil spring. A shows the parts assembled, this being a cross-section through the wheel and tire, while above it is depicted a side view to a small scale with two units in place. D is a top view of the clip and brings out the three holes which are bored through it, two for the ends of the surface pad H and one for the stud C.

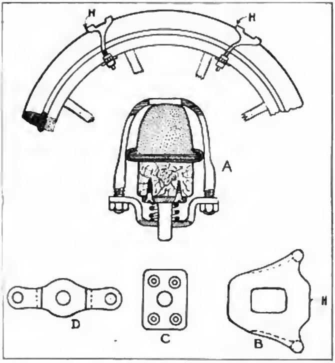


FIG. 4—AN IMPROVED TYPE WHICH GAVE MUCH BETTER RESULTS ALTHOUGH SOMEWHAT EXPENSIVE

The latter is attached to the underside of the felloe with four screws, and a spring placed around the central stud before the yoke is set over this. B shows the pad in detail, the hole in the center presenting an additional edge, and thus giving greater holding power. In forging this member the surface portion is set off center with the side bars in order that one edge, the forward one, may be in contact with the tire at all times. The function of the stud is to hold the yoke and pad in position, while the spring draws the latter against the tire, even under load compression. It will be noted that each pad may be removed by unscrewing two nuts. When these are made from .187 to .25-in. stock they do very well for ice and snow on pavements, but for the same over a mud surface the material should be from .25 to .312 in. thick. With either four or six of these to a wheel it is possible to get out of a very bad mud hole or unusual snow and ice combination.

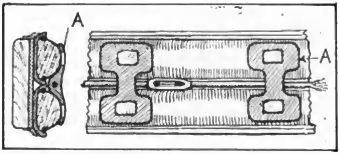


FIG. 5—MODIFICATION OF THE FORM SHOWN IN FIG. 4, TO FIT IT FOR USE WITH DUAL TIRES

The small amount of work connected with the removal of these is such that they can be taken off as soon as the worst part of the route has been passed. They have this additional advantage, that it is not necessary to jack up the wheels or move the vehicle forward or back to put them on or take them off, since the material is not continuous. On dual tires a form similar to that shown in Fig. 5 was very successful on 36 by four sizes. For those who wish to construct something along these lines it should be said that the pad A can be a drop forging or steel casting with a longitudinal hold for a steel cable which can be brazed in place. A turnbuckle is used to draw this together.

Figs. 6, 7 and 8 show a number of views taken on the New York streets during a recent heavy fall of snow.

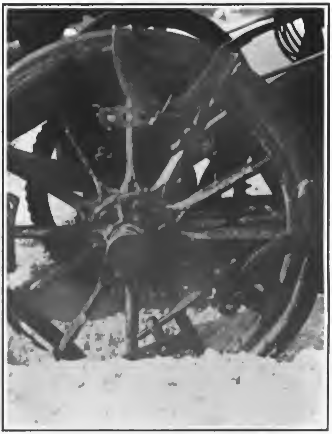


FIG. 6—PHOTOGRAPH OF NON-SKIDDING DEVICE SEEN ON AN ELECTRIC TRUCK DURING A SNOW STORM

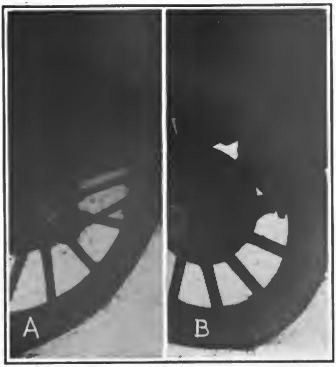


FIG. 7—TWO MAKESHIFTS WHICH DID DUTY IN RECENT SNOW STORM. A, SINGLE ROPE. B, OLD SHIRT

Fig. 6 presents about the best-looking combination which was seen, this being a regular device, although incorrectly fitted. In the next view two forms are presented, that at A consisting of a single turn of rope, while B was nothing more nor less than an old shirt tied around the tire and one spoke. The last figure shows four other equally interesting forms of non-skid devices, in the first three of which the real trouble with rope is brought out. At A, B and C the cut ends of the rope will be noticed. Where this material is used the sharp edges of rubber or tire band are almost certain to sever it in a mile or less of city pavement running. This gives the rope, even when knotted after every turn of the tire, a very short life. In talking with the manager of another large fleet recently he stated that their experience with chains had been very similar. The ordinary chain, which you buy for this purpose, is good for a half dozen blocks under a five-ton load, and those which have gone a mile in service can be counted on the fingers of one hand, he said. Wherever the subject of anti-slipping or non-skidding devices is brought to the attention of any large or small user of commercial vehicles, almost the first question asked will be, "Can you tell me of a good one?" Without making any statement as to the merits of devices on the market, it should be stated that a very large future exists for the first manufacturer of something on this order who is able to produce a device that will satisfy the car owners and deliver unfailing and efficient service. It should possess in addition the two virtues of simplicity and moderate first cost. Under the former head is included not alone a plain shape for the parts, but also a quick and easy method of attaching and such lines as will not detract from the appearance of the vehicle. The writer has interviewed a large number of brewery men on this subject, and without a single exception they state that they would buy large numbers of a device which filled these requirements. A number of them have gone so far as to design and manufacture their own, but a lack of mechanical skill along these lines and the fact that the problem is not as simple as it sounds have combined to prevent their producing anything which might be classed as perfect. In the majority of cases, however, the brewers say that in their own forge shop they can produce forms which will do their work better and at a lower cost than anything they can buy.

From the manufacturer's standpoint the importance of this little item cannot be overestimated, as its absence during a larger portion of three months in the year makes the truck almost as useless as it would be without a motor or transmission. Furthermore, in this condition the vehicle is a positive source of danger, for once skidding has been started no one can tell where it will

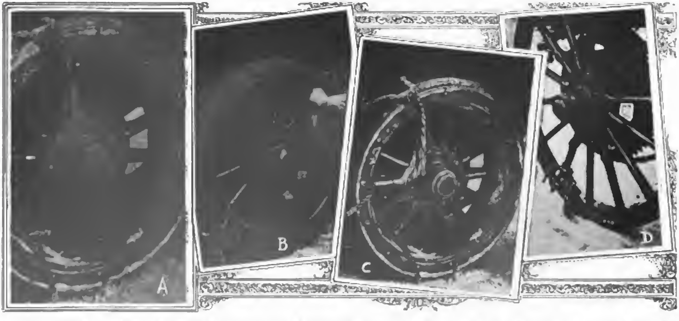


FIG. 8—FOUR MORE NON-SKIDS SEEN ON NEW YORK COMMERCIAL CARS AFTER SNOW FALL, MOSTLY VARIETIES AND SIZES OF ROPE WOUND AROUND TIRE AND SPOKES

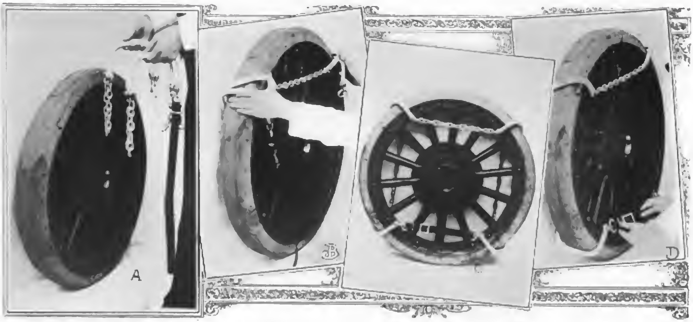


FIG. 9—FOUR VIEWS OF THE NEW NON-SKID CHAIN, WHICH HAS BEEN BROUGHT OUT RECENTLY, INDICATING THE EASE WITH WHICH IT MAY BE APPLIED

end or how much damage will be done. For these reasons it behooves vehicle manufacturers to give this matter attention whether they wish to or not.

One point, as brought out previously in this article, is the matter of quick application and removal; without these the best of devices is useless, for the drivers will not put them on when needed or take them off when the necessity for their use is ended, and thus wear them out quickly. A new form has just been put on the market by the Atlas Chain Company, Brooklyn, which possesses all of these qualities. In the accompanying illustration, Fig. 9, this is brought out by the successive views. At A the man is just starting; at B, the upper member is being placed, while at D, the lower connection is being made. C reveals the completed job ready for service.

REMARKABLE RUN OF FEDERAL TRUCK

In the recent Glidden tour a one-ton Federal commercial wagon, made by the Federal Motor Truck Company, Detroit, Mich., was utilized to carry the baggage for the tourists, amounting at all times to 2000 pounds or more. During the entire 1461 miles this vehicle showed remarkable qualities, delivering its load each night on time. When the rains and deep mud of the roads encountered is considered, this performance becomes a noteworthy one.

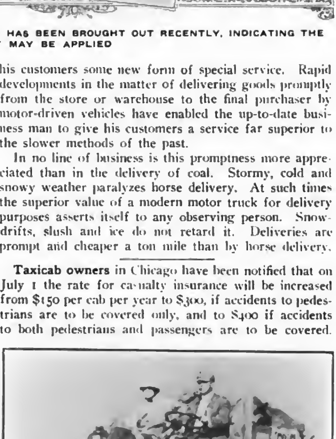
In the severe work, notably from Roanoke to Winston-Salem, N. C., it was materially aided by the Lyon non-skid grips with which the wheels were equipped. In a letter from the car maker to the Lyon Non-Skid Company, Philadelphia, Pa., maker of this accessory, a large portion of the success in negotiating the slippery hills is attributed to them.

MOST EFFECTIVE WHEN MOST NEEDED

Under the above caption, a contemporary specializing in coal haulage prints the following, which seems appropriate enough to reprint: The modern merchant is daily seeking for new methods whereby he can give to his customers some new form of special service. Rapid developments in the matter of delivering goods promptly from the store or warehouse to the final purchaser by motor-driven vehicles have enabled the up-to-date business man to give his customers a service far superior to the slower methods of the past.

In no line of business is this promptness more appreciated than in the delivery of coal. Stormy, cold and snowy weather paralyzes horse delivery. At such times the superior value of a modern motor truck for delivery purposes asserts itself to any observing person. Snowdrifts, slush and ice do not retard it. Deliveries are prompt and cheaper a ton mile than by horse delivery.

Taxicab owners in Chicago have been notified that on July 1 the rate for casualty insurance will be increased from $150 per cab per year to $300, if accidents to pedestrians are to be covered only, and to $400 if accidents to both pedestrians and passengers are to be covered.



FEDERAL BAGGAGE TRUCK IN GLIDDEN TOUR, SHOWING TIRE GRIPS IN PLACE

Commercial Car Questions Discussed

Number of Vehicles in Use Interests

Editor COMMERCIAL VEHICLE:

(10)—Noting the omission of Spokane from the list of cities in which commercial cars are in use, I write to state that there are 55 such vehicles in this city at the present, but the expectations for 1912 include the sale of not less than 100. This will be an increase of approximately 200 per cent. and one of which Spokane may be truly proud. B. G. Davidson.

Spokane.

This city was omitted from the list because it had less than 60 cars in use, as was the case with a number of other cities similarly situated. The correspondent's statement that Spokane now has 55 as a total bears out the figures which were available in December when this list was published. The 200 per cent. increase for the coming year is approximately that which a large number of cities all over the country expect to show this season. As the entire State of Washington boasts but 116, it is seen that this hustling city possesses almost half of the entire State at that.

Another on the Commercial Car List

Editor COMMERCIAL VEHICLE:

(11)—On Nov. 15th, 1911, there were 754 motor trucks in Los Angeles instead of 70 as reported and shown in your list on page 616 of the December issue of the COMMERCIAL VEHICLE. Of these 365 were of 1.5 tons capacity or heavier. Never put Los Angeles at the bottom of any list of that kind, or, for that matter, of any list. C. S. Howard.

Los Angeles.

Mr. Howard being the selling agent for a prominent make in his city doubtless knows what he is talking about, so that this journal accepts his amended figures, even though they show that this town has 36.5 per cent. of the whole State as reported by its secretary. On Dec. 1st he wrote that there had been licensed by his office just 2,063 commercial vehicles. This matter has aroused so much attention and comment that doubtless this paper will publish in a short time its own revised-to-date figures. In the issue of Jan. 4th, 1912, *The Automobile* gave 25,541 as the whole number, this being comparable with 15,520 in the December issue of this paper.

Truck Life and Guarantees of Service

Editor COMMERCIAL VEHICLE:

(12)—As a prospective purchaser, I write to ask you what it would cost the manufacturer to guarantee his product for a full year or more. Would it cost so much as to necessitate adding something to the sale price, and even if it did, would not this be better business for both buyer and manufacturer? A. V. Devlin.

Passaic, N. J.

Information as to the exact cost of guaranteeing the parts of a vehicle for a stated time is neither complete nor accurate, but from a statement by the Studebaker Automobile Company it is possible to get some idea of it. This firm stood back of its pleasure car product to the extent of replacing defective and broken parts with new ones and found the cost from March, 1905, to October, 1908, amounted to $16,620.18. During this period 1,571 cars were sold, so that the expense of a car was but $10.51. This covers a period of 3.5 years, so the cost for each car during one year would be but $3.

Based on the admittedly greater and more severe use of commercial trucks, vehicles of an equivalent quality of material and workmanship should not cost the manufacturer to exceed $10 a year a car for a large number of vehicles. The last idea is added because the smaller the number of vehicles the greater the overhead expense of handling the repair parts. In this connection it should be stated that the cost cannot be prohibitive since Wyckoff, Church & Partridge, Inc., is now guaranteeing its Commer truck for seven years.

Oil Consumption on Commercial Vehicle

Editor COMMERCIAL VEHICLE:

(13)—Will you please give me some idea of the average oil consumption of delivery wagons and trucks in miles a gallon. We have a small car and a big one, on both of which we think the drivers very wasteful of lubricant, but as we have no data to prove this and they say that plenty of oil is necessary, we cannot do anything. D. W. Wilkins.

Philadelphia.

This is a difficult matter in which to give advice since the influence of driver, make of car, size, character of load and roads traveled, dimensions of engine and lubricating system used are so great. Having this many variables it is impossible to give any very exact figures. In competitive tests the results obtained represent almost the minimum figures for that kind of work and could hardly be duplicated in actual practice with average unthinking drivers.

In one test of this sort in France a Saurer heavy truck covered the 1794.5 miles on 37.7 pints, equal to 47.8 miles a pint or 382.4 miles a gallon. The second car in this respect was also a Saurer with 52.8 pints, or 34 miles a pint and 272 miles a gallon. The third vehicle was a De Dion, the figures of which were respectively 70.4 pints, 25.4 miles a pint and 203.2 miles a gallon. To go with these figures one can add that the Commer truck is guaranteed to give 400 miles a gallon. All four of these are heavy cars, and the figures should be relatively higher for the smaller ones.

Crankcase Bearing Forms and Leakage

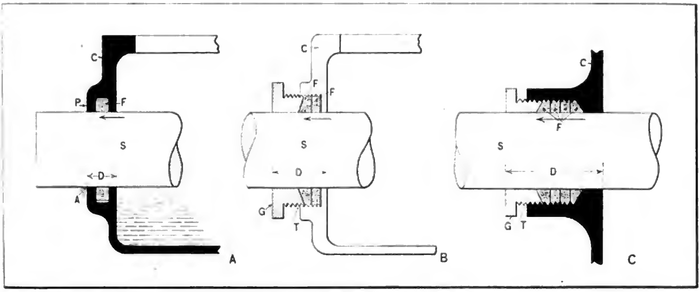
Editor COMMERCIAL VEHICLE:

(14)—The end of the crankcase (forward end) bearings on our motor truck leaks oil continuously and we seem unable to stop the same. The amount and quality of lubricant within the case has little to do with it, the stuff coming through for a little as much as a lot. A sketch is inclosed of the construction of this (A herewith), showing how this part of the motor is built. We have tried winding all kinds of material on the shaft both outside and inside the case, but this has availed nothing. We have changed the packing several times, making the central hole smaller, but that did not help any. Can you help us out? **Bindley Hardware Company.**

Pittsburgh.

The sketch depicts the case at A and the suggested change at B, as well as a second better plan but a more expensive one at C. In these S is the shaft, C the crankcase, F the felt washer, P the boss or bearing on the case within which the groove is turned, while D indicates the length of total bearing on the shaft and A the point of leak.

The drawing shows that the trouble lies in the length of bearing, both total and on each side of the felt washer. This must be lengthened. There are several ways of doing this, the one suggested being to cut off the downward projection at P and thread this for a cap which is cut out internally. This will give room for about double the amount of packing, while if the gland G be cut out inside a secondary smaller sized packing can be inserted there. The screw threads allow of compressing the packing so it grips the shaft tighter. The combination of this action with the doubled length of leakage distance D will stop the trouble.



THREE SKETCHES SHOWING HOW A BAD CRANKCASE OIL LEAK MAY BE STOPPED, WITH ONE INDICATING HOW THE CASE IS IMPROVED PERMANENTLY

A better plan would be to have extra metal welded on the outside of the boss, making this very long as shown at C. Then this could be bored out and threaded similarly to the one just described. The same form of gland G may be used, but the amount of packing at F is quadrupled as is also the leakage distance D. This will stop the loss of lubricant to a certainty, although it would cost about twice as much as the scheme at B.

Missing and Some Causes of It

Editor COMMERCIAL VEHICLE:

(15)—Can you give me some idea of the reason for my motor's missing as it does? It pulls well on hills and grades, or through sand or other heavy road surfaces, but as soon as I try to speed up on the lever she will miss. The ignition appears to be right in every respect, the magneto being nearly new and clean. The carburetor has previously given the best of results, while I am certain that the inlet pipe is clean and clear throughout its length. The only source of trouble is the fuel pipe, which has several sharp bends, one of them at the bottom of the vertical portion being an exact right turn. The seat is located over the engine and the gas tank is underneath. From this a vertical lead goes down to the carburetor on the right side, crossing over just above the engine support. All these pipes are well stayed to the frame work, but I suppose they vibrate some. R. W. DOYLE.

Pittsburgh.

Missing is due usually to one of two causes—faulty ignition or defective flow of fuel under certain conditions. The former is more often the cause than the latter, and may assume any one of a large number of forms; collected carbon within the cylinders or in the valve pockets may heat and cause preignition and backfiring, wires which are not connected properly may vibrate to the extent of striking metal and short circuiting in that way through the insulation, water or other foreign matter may get into contacts or onto terminals, some of the latter may not be connected tight enough, so that they jar loose at high speed, and other things may all induce trouble of this sort.

In the trouble described above, it would appear, however, as if the fault lies in the bent pipes, which vibrate enough at high speeds to contract the walls and shut off the flow of fuel. This causes the motor to slow down, so that vibration ceases, then the pipe straightens out and the liquid flows again. This performance is repeated over and over again, and the driver is led to think that there is a flaw in his wiring of the insulation thereof.

On another page, under the heading of mechanical notes for drivers, several cases of missing are described and suggested remedies for the trouble made. It is believed that the correspondent above will benefit by referring to that article, although there seldom is an instance of missing which is exactly like any other case.

Mechanical Notes for Truck Drivers

Handy Way of Operating Acid Bottles

One of the meanest things in the entire garage to keep and use is the bottle in which acid comes for use in replenishing storage battery electrolyte. This is bottled in unusually large glass containers. Their size makes these difficult to handle, while the weight is considerable also. The contents being an acid, employees are chary of spilling any on themselves. The combination makes more difficult than anything else in the electric garage. One way of handling this which is commendable is the construction of a platform upon which to keep the same, making this of such a size that the box in which the bottle comes may be set right into place.

As the sketch on this page shows, the rear part is a simple rectangular platform on which the box rests, but the front ends of both base pieces or skids are carried up in a curved form, uniting at the top with two verticals for the sake of rigidity. This can be pulled around the garage, using the skids as runners, while on reaching the desired position the back is lifted and the whole outfit rocked on the curved runners, thus tipping the bottle so that liquid is poured out of it. It is simple to make, handy at all times, durable although made from ordinary hard wood, and possesses many other estimable features.

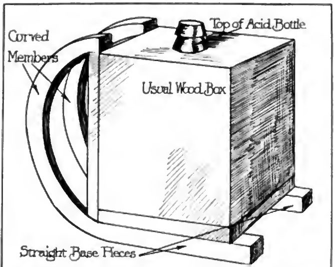
Locating Ignition Trouble

In event of irregular operation or skipping in the motor the first point to be looked at, if the trouble is ascribed to poor ignition, is the condition of the source of current when a coil and battery system is used, or the spark plugs when a magneto ignition group is employed. Then the wiring demands attention to see that there are no broken leads or loose connections. The timer should be inspected for defects and all parts for accumulations of oil that might cause short circuits and allow escape of energy. If the skipping is accompanied by backfiring and the trouble is not caused by poor mixture, the points to be looked at are the timer and the coil trembler contacts, or the magneto make and break points.

If the power is not as it should be and the engine operation is fairly regular, look at the battery. Often a weak battery will cause lost power without producing misfiring. Broken spark plug insulation will cause irregular ignition, as will too great a gap between the spark plug points, especially if magneto ignition is used. A sudden stop indicates a broken wire, while a loose terminal will produce irregular engine operation.

Misfiring is often caused by one or a combination of the following conditions: Loose connections, broken insulation, oil-soaked wiring, lack of current in batteries, worn timers or distributors, defective igniters or spark plugs, burnt contacts at magneto make and break, poor contacts at coil vibrator, cracked insulating bushings, broken brushes or oil deposits in magneto and defective armature or coil windings.

If a wire or set of wires is suspected, a test can be made by running temporary wiring known to be in good condition. If this does not improve operation it shows that the suspected wiring is not at fault. Units may be shifted in the coil (if a multi-cylinder form), and defective units easily located and replaced. Spark plugs may be changed from a good cylinder to one that is missing fire. Then, if the engine still continues to work poorly on that cylinder, it is reasonable to assume that the spark plug is not defective. Hold the high-tension wire of the suspected cylinder about .125 inch from the spark plug terminal while the engine is running; if a spark jumps the gap regularly it is certain that the parts of the ignition system are functioning properly and that the trouble is due to poor carburetion or some defect in the engine valves.

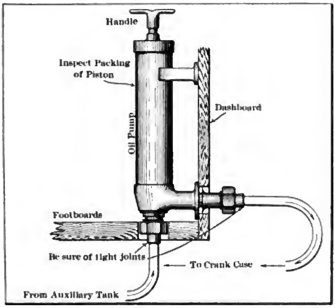


HOME-MADE STAND FOR HANDLING ACID BOTTLES

Oil Pumps in Cold Weather

A number of cars and trucks have a small hand oil pump for forcing lubricant to the cylinders and crankcase in cold weather, when the stuff there is liable to have congealed and thus be temporarily useless. This is exceedingly handy, for when the motor will not start readily and turns over very hard, a few strokes of the hand pump will force in new, fresh liquid lubricant and the friction between metal faces will be reduced so that the engine can be cranked with ease.

There are a number of small precautions which should be observed with such an accessory, however. One of these pumps is shown in the figure herewith in place on the dashboard. This is the ordinary location, although the angle differs, some being set so the driver pushes straight forward for a down stroke, instead of leaning toward the pump and then making an absolutely vertical stroke. Many drivers prefer a large and broad handle; pumps are not so fitted, hence it will be necessary to



OIL HAND PUMP INDICATING SOURCES OF TROUBLE

attach a metal or wooden extension to the usual form.

At all times the condition of the packing is of great importance; it should be inspected for completeness, tightness of fit in the cylinder, quality of material used to withstand continuous use, and other matters of minor import, such as the permanent fixing in position, etc. The packing will have to be tight in order to draw the oil from its tank and force it to the motor; it will have to be of the fullest possible length in order to be efficient and last, it should be of a durable, non-compressive material so that it will not lose its tightness. There are several other points about the part which should have attention.

Thus the method of fixing it in position must be good as well as tight; if not permanent the pump will come loose, and by wobbling around under the pressure exerted to move the plunger spring a leak in some of the joints. The latter, two in number, ought to be inspected frequently for leaks; if there are any the efficiency will be impaired. In some cases these have a metal-to-metal contact; when this is the case, simply tightening the nuts will give the desired result. Other forms have a small amount of packing between the metal faces; these may need new packing or additional material besides tightening of the screw threads. In order to get the fullest possible amount of oil at each stroke the pipes should be examined throughout their length for bends or other contraction of the walls. Usually these are copper tubing, easily bent but not as quickly straightened.

Preserving the Motor Timing

In taking down an engine for repairs or replacements, one of the first things to give the amateur trouble will be the timing of the valves. This is controlled by the cams, which depend on the angular position of the camshaft. The latter is fixed by the meshing of the driving gears at the front of the motor. If these be not marked, putting them back in the exact previous position will be difficult and almost impossible at the first trial.

For this reason it is advisable to mark them at the outset. This is done with ease, requiring only a hammer, a prick punch and some patience. As the sketch shows, the best method is a mark or series of identical marks on the sides of adjacent teeth and spaces of the two gears in such a way that the two when brought together and so placed as to be on a direct line between the two centers will give the desired result. If another gear meshes with the driving member on the crankshaft this should be punched at the same time with a different mark.

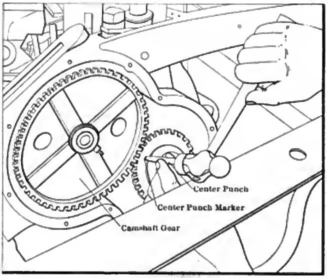
While the punch holes would seem to indicate the exact position, the difference in diameter of the two gears makes it possible to set the camshaft wrong even with them. For this reason some position of piston or valve should be assumed and the valves marked at that point. Then, in replacing the parts, by bringing the crankshaft to the previous position of piston or valve, the cam gear can be slid into place and absolute accuracy result.

Enlarging the End of a Worn Shaft

Often the extreme end of a shaft will wear for some unknown reason to such a point as to make a disagreeable noise in rotation or give other trouble through its small size. This can be remedied without the necessity for replacement, if the wear is not too great, by expanding the end. To do this a small, straight hole is bored in the worn end, but not too deep, say, one to 1.5 inch. Into this a taper pin is set and driven home. If the hole be deep enough and the pin be well oiled, it will be possible to produce as much enlargement as is needed and at the same time recover the pin.

In order to get the exact size, a collar should be made just equal to the bearing in which the shaft fits, and this held in place around the latter while the driving process is going on. The pin may be forced in until the expanded portion just fits the collar, when the latter may be driven off and the pin removed. If the collar be a few thousandths larger than the bearing this excess size can be taken off with emery paper in a lathe without wasting more than a few minutes, the whole resulting in a much neater and better fitting job.

When an odd-sized nut must be handled and the proper wrench is not available, a larger member may be utilized by slipping in between the nut and wrench face a series of flat steel strips or when possible a single bar of the right thickness.



PRESERVING THE MOTOR TIMING BY PRICK PUNCH MARKS

The Syracuse Commercial Car Situation

SYRACUSE, N. Y., Jan. 25.—C. Arthur Benjamin, president of the Automobile Dealers Association and himself agent in this section for Packard trucks, is conducting a campaign of education in the matter of the more careful handling of trucks by their drivers. Mr. Benjamin says that too little attention is paid by the purchasers of trucks to the qualifications of the men employed to drive them. Mr. Benjamin has been carefully watching these "drivers" on the streets and he says they are costing their owners a lot of money in maintenance. He calls attention to the excessive speed maintained by industrial "joy riders," with quick stops at street intersections where the driver knows that a traffic officer is stationed. With so abrupt a stop the strain on the tires is tremendous and the life of the tires through such treatment is shortened by thousands of miles. Mr. Benjamin, for the good of the industry here, has given pointers wherever possible. He says: "I think any big truck operator can show a great saving in tire expense each year by maintaining a careful system of inspection through which his drivers may be kept under observation at points along the route. By checking up each driver in a quiet way at times when he thinks he is not seen the careless ones could soon be weeded out."

Carelessness in this matter of driving, with consequent expense to truck owners, may account for the fact that while lighter trucks are being bought here in increasing numbers, the market of the heavy vehicles is restricted more decidedly. It has been estimated here by men in the business that, while the number of lighter commercial cars in town now approximates 200, the heavy truck list is still well under 25. The agents, too, have a theory that the reason for this is the large cost for up-keep, in some cases owing to the carelessness of drivers. Hence the agents propose a campaign of education that may be hard on some of the careless ones.

The Chase Motor Truck Company, of this city, continues active. It made a shipment of trucks to Stern Bros., the New York dry goods firm, the other day, and as the machines were being loaded onto the freight cars received a repeat order. This concern also has shipped a model D express, capacity 1,500 pounds, for use in the United States Custom service at Newport, R. I. This is the second Chase truck sent there, the other being in constant use carrying torpedoes and supplies from the wharves and freight yards to the torpedo station post. The Chase firm has shipped 12 powerful trucks to Vancouver and another to Manila.

It is announced, too, that the Chase Motor Truck Company is about to bring out an attractive line of motor 'buses suitable for hotels and pleasure resorts. These will be made in several sizes to accommodate from six to 12 passengers.

A new concern, the E. B. Sabine Company, is shortly to be incorporated in this city to handle a general line of motors, featuring the commercial car. Several prominent men here will be concerned. Temporary headquarters have been established in the Bissell garage, 109 South State street.

The Stoddard-Dayton agency, of which A. W. Zimbrich is the manager, has added the Gramm truck to its line and has arranged for demonstrations.

MACK TRUCK SUCCESSFUL ON HILLS

The Keystone Commercial Company has recently purchased a Mack truck of 4500 pounds capacity which it is using in its suburban deliveries starting out from the big terminal warehouses on the South side, Pittsburgh. The experiment is exceedingly satisfactory thus far. The vehicle is doing the work of two teams and makes a trip to Homestead, Pa., and return and to Wilkinsburg, Pa., and return in one day besides doing quite a little running around the city. The officials report that much heavier loads can be drawn and that there is a great saving in time at every stage of the delivery.

KNOX-MARTIN TRACTOR DRAWING A FIRE ENGINE, AN OUTFIT INTENDED TO BE SHOWN AT THE RECENT GARDEN DISPLAY BUT CROWDED OUT

Commercial Vehicle Progress in Montreal

BREWERY and mineral water companies in Montreal find that the motor truck is most advantageous to them, for it not only enables them to deliver more expeditiously, but it has a tendency to increase their business. One mineral water company claims to have had its five-ton truck make three trips from Montreal in one day, fully loaded—one to Laprairie, another to Lachine and another to Cote Des Neiges—and also two trips a day to Terrebone.

As an instance of hill climbing powers, a three-ton truck had a full load of 9,000 lb. of goods placed on it, carrying besides the helpers, composing six men, and it negotiated one of the most difficult hills in the city for vehicles—Guy street hill—with the greatest of ease.

The comparative cost of operating a three-ton truck and horse-drawn wagon is stated to be as follows, including drivers, per month: three-ton truck costing $4,335; total cost per month, $266.93; 2.5-horse truck of three tons capacity, making 16 miles per day, costing $2,175; total cost per month, $362.58. A profit of 24 per cent. on account of increased efficiency without taking expense economy into consideration at all is said to be secured.

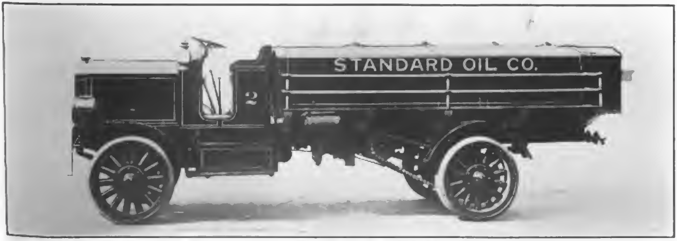
The receipts at the offices of the Provincial revenue authorities point to the tremendous increase in the number of automobile owners in Montreal and district. A few years back motors were almost conspicuous by their absence in the city, but during the past four months no fewer than between 1,200 and 1,400 licenses have been taken out. The license fees vary from $5 to $20, according to the horsepower of the cars, and it is estimated that from these fees, together with fines imposed on speed limit breakers, some $20,000 will accrue, all of which will be devoted to improving the provincial highways.

Three motor trucks were ordered recently by the Board of Control for the use of the Montreal fire brigade. This is the first step to replace horses, which Chief Tremblay states cost more than motive power now extensively used in most cities as far as Moscow in propelling fire apparatus. The board recommended that an automobile hose wagon and two motor trucks, one for hauling an aerial ladder truck, be supplied. The hose wagon will be double the size of the ordinary wagon, inasmuch as it will contain 2,000 feet of hose instead of 1,000 feet, and it will have as a special feature a turret tower which can be connected with fire engines for fighting heavy fires in lower stories of buildings. Two of the motor trucks to be bought are intended to be hitched ahead of a fire engine and of an extension ladder. All that will be required is to remove the front wheels of an engine or a ladder and attach the motor truck, which would do the pulling. The motor hose wagon is a separate vehicle. Though the initial cost is greater, Chief Tremblay contends that in the end the motor will be cheaper than horses. For example, it costs about $650 a year to keep four horses to haul a large ladder, while the cost of the motor would be about $75, exclusive of a chauffeur, but a chauffeur or driver was needed for horses as well as for a motor and the difference was nil on that score.

Great Motor Project.—Germany's new West African territory is to be linked up with its East African colony by a service of motor cars across the continent passing through the Belgian Kongo. The connecting of different districts by a service of motor cars has already been tried with encouraging success in the Belgian Kongo, and the German Government has decided to adopt the same means of communication. New roads will have to be cut through forest and hewn out of mountainous country; bridges will have to be constructed to span rivers, and a considerable amount of organization will be necessary before the scheme gets into working order; but already a number of German engineers and military officers are surveying the ground.

The large bakery house of L. A. Cushman Company, of New York City, has recently put in use a Packard truck which has displaced eight single-horse wagons. It carries a load of thirty-two large baskets of bread from the bakery shop at West 59th street to the various retail depots, averaging about 30 miles every day.

Motor Buses.—The Cape Electric Tramways (Ltd.) has decided to establish a motor-bus service in Cape Town, to act as a feeder to the general tramway system.



NEW THREE-TON TRUCK FOR STANDARD OIL COMPANY, MADE BY LONGEST BROTHERS, OF CINCINNATI. A NEW FIRM AND A NEW PRODUCT

Accessories and Components at the Shows

The Various Parts Without Which the Car Would Be Incomplete Were at the Big Displays in as Great Variety and Numbers as the Car Makers —Brief Mention of the More Important Firm's Products

ALTHOUGH the exhibitions are supposed to be held for the car makers alone, it is a well known fact that the parts makers cut fully as large a figure each year at this time. In fact, when the whole amount of space and that given the accessory people is figured out, it usually is the case that the latter have the larger portion by far. It would not be far from the actual case to state that this section runs from 60 to 70 per cent. of the total. And yet the actual number of different concerns and the space they take up has little bearing upon their importance in the industry. Without them assembled vehicles would be an impossibility. Were they nonexistant, the hugh productions would be out of the question; outputs would be restricted in a great amount, while the number of workers would be reduced materially.

This in turn would reduce the number of families dependent upon the automobile industry for a living, while the output curtailment would lower its importance as compared with others. Each year they buy large quantities of space, the revenue from which aids in making the big displays possible. With the necessity for commercial vehicle shows the same division has arisen among the parts people, those making for pleasure use only exhibiting during the first week and the other in the second. Only a few firms overlap and display in both, showing the marked individuality which has been brought forth in this branch of the industry during a few years.

Commercial Tires, Tire Chains and Accessories

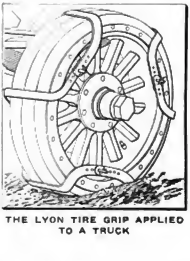
ONE of the most important parts, in fact, a component which has a very large bearing upon the progress of the commercial vehicle, is the tire. The displays this year showed a number of new forms as well as accessories. A couple of substitutes for the present tire and wheel combination were exhibited at the Palace, these being a spring wheel in which tubular spokes contained coiled springs and a resilient form in which the wood felloe floated upon a series of hollow rubber rings. At the Garden, in the General Vehicle space, there was seen a form of wheel and tire which has been invented and constructed for his own use by a prominent New York brewer. This had block rubbers with steel castings over them, the rubber furnishing the resilience, while the steel withstood wear and possessed non-skid properties. Another exhibitor at the Palace displayed steel tires without any special construction.

In the main, commercial car tires are of the solid form, although a very large number of small cars have pneumatics. The electric car has brought forth a demand for a cushion form which would have more resiliency and less weight than the solid, at the same time affording a substitute for the pneumatic and without any dangers from punctures or blowouts. For these reasons, while the larger portion of the various stands was given over to the continuous and block forms, some pneumatics and cushion forms were made prominent.

NEW REPUBLIC TIRE WITH PROJECTIONS

The United States Tire Company had one of the largest spaces, at which a demonstration of the new demountable form of rim recently illustrated in these columns was given. This form is very similar to that formerly marketed by the Continental concern, now a component of the larger organization. It has a pair of side flanges with tapered upper surface upon which a tapered lower edge of the tire band rests. As the flanges are drawn in by the through bolts, 12 or more in number, the tire is moved out further, and thus tightened upon the wheel. In the dual form, a middle ring has a double taper, so as to be the equivalent of two flanges. It is hollowed out inside for lightness. In addition, the well-known Knobby treads, Bailey and other forms of pneumatic were displayed. The trade has been advised that the former type will be continued, despite litigation.

The Firestone Tire & Rubber Company, also had a large space in which were shown to good advantage the many sizes and styles made. Among these the demountable was very prominent. This form is really a side wire, but the channel in which it is mounted



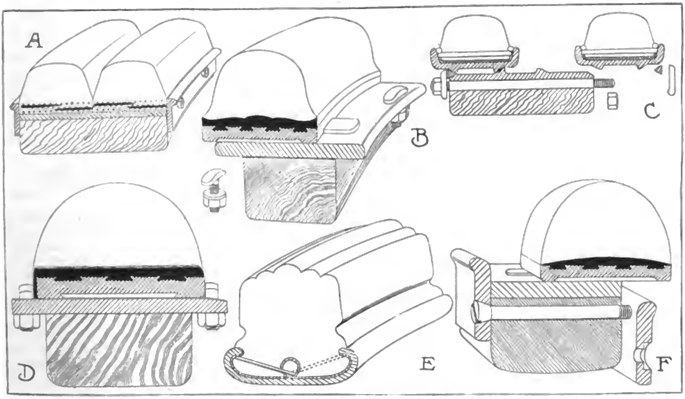
THE LYON TIRE GRIP APPLIED TO A TRUCK

is made with tapered lugs on the under side while the wheel band has similar projections. Bolts draw the two together. In tires on electric trucks and pleasure vehicles, there is a choice between a special electric tire of standard design and the new cushion electric tire. The latter has a double tread and internal cavities to make easier riding. It is made in the regular side wire type and its rims are interchangeable with pneumatic rims without altering the felloe. Both tires are made of rubber that has long been known for its easy riding and economy of current consumption. For heavy trucks there is, in addition to the regular line, a new tire with a hard rubber base. It is vulcanized in the standard endless rims, but has no cross bars or side wires. Besides this, Firestone has a new side wire block tire with a continuous base and without metal plates. There are in all six tires for resiliency and heavy service, including single and dual types. They are designed especially to permit reasonable speed and at the same time protect fully the mechanism of the car from road shocks, and thus keep down its repair expense.

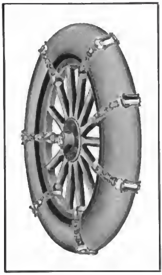
The Motz Company showed its cellular form, which is made to fit clincher rims. This is intended for lighter cars and all forms of electric vehicles, on which it is claimed to give a greater mileage. Be that as it may, there are a number of tires on the market this season which resemble this pioneer form in one way or another very closely. For heavy duty trucks operated at slow speed, the Motz people are now featuring solid tires on demountable rims. The importance of this feature hardly can be overestimated. It saves hours of time in replacement, thus greatly increasing the working capacity of truck and driver. And if the tires on the right wheels wear down faster than those on the left, with demountable rims, they can be exchanged, and wear equalized.

The B. F. Goodrich Company showed, among other things, a tire which is typical of the so-called wireless hard rubber base tire. The tire is built upon a steel ring which has a number of circumferential dovetailed grooves cut in it. Into these grooves are moulded the hard rubber base from whence the tire derives its name. On top of this is vulcanized the soft rubber tread. The object of the hard rubber is to secure the tire to the steel band—this is done mechanically by the undercut of the dovetailed grooves. The soft rubber is readily vulcanized to the hard rubber. In other words, one may say that the hard rubber acts as a sort of cement or binder to secure the soft rubber tread to the steel rim. This steel rim has on its inner side a central part or shallow groove which is filled with soft rubber. The object of this is to make the tire cohere to the felloe band, onto which it is forced by hydraulic pressure. A key way is cut in the tire rim and a key secured to the felloe band fits into this and prevents the tire from creeping on the wheel. The tire is kept from coming off the wheel by lugs spaced at equal intervals, on either side, which pass through the felloe band and are secured in place by bolts and nuts. In addition, a new wireless block form was displayed for the first time. In the dual type this has a pair of rims shrunk on over the standard S. A. E. permanent band, a key which engages a keyway in the blocks, the rubber biscuits, a segmental retaining flange and the necessary bolts, nuts and washers. By loosening the necessary bolts, a portion of the flange may be taken off, allowing the horizontal removal of the affected block. This can be done, too, without jacking up the wheel or disturbing other parts.

The Goodyear Tire & Rubber Company showed its regular and demountable solid forms with hard rubber



SECTIONS THROUGH A NUMBER OF THE PRINCIPAL TIRES FOR HEAVY TRUCKS, SHOWING AT (A) DIAMOND, (B) GOODRICH, (C) FIRESTONE, (D) POLACK, (E) SWINEHART AND (F) GIBNEY



NEW WOODWORTH TIRE CHAINS

base, the Motz type of cellular tire, and a new and different block construction with diagonal edges. The first has a base which is oval in section and is not the full width of the tire. Endless wires are moulded into it, which make the tire strong and practically nonstretchable. The rubber of the tread—since it practically surrounds the core—has a mechanical hold as well as that due to the vulcanization. Transverse grooves are formed in the tire which received transverse plates on the tire seat of the rim. This prevents creeping of the tire—the tire is forced onto the rim. Side rings or flanges riveted in place prevent sidewise motion.

The Goodyear Company, realizing the demand for a tire which could be easily removed from a wheel and replaced by another, has brought out a demountable. This comprises a beveled felloe band on the wheel and beveled side or wedge rings. The base or rim of the tire is beveled to the proper angle to fit the top of the wedge rings and is hollowed out in the center. The diameters of the felloe band and of the tire rim are enough different to allow bolts to pass through the side rings from side to side without touching either. No means is used to prevent creeping of the tire rim on the felloe band, as the friction between the wedge rings and the felloe and the rim is deemed sufficient for this purpose.

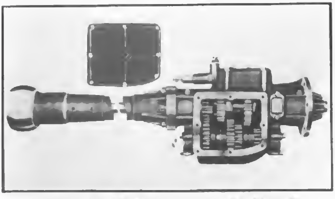
The block form is made with a rubber unit of the entire width, this being formed to a sort of spiral. Each biscuit has extended edges, upon which cross bars attached to bolts through the felloe rest and serve to hold it in position. By removing four of these, that is, two pairs, any block can be removed without disturbing the others.

J. L. Gibney & Brother displayed the standard line of side wire and wireless forms made by it. This design has been unchanged for a number of years, proof positive of its inherent quality. The justification of this policy is attested by the fact that the tires are warranted for 25 miles a day for one year, provided a stated load is not exceeded. An exhibit which showed the excellence of materials and workmanship, and design, of the tire was a couple of tires in which the rubber tread was worn down to within .125-inch of the hard rubber base. This alone was an eloquent testimonial to the durability of the method of construction, although said to be very common for this particular make.

Bearings, Axles, Radius Rods and Jackshafts

BEARINGS have a large influence on the modern commercial car, for without proper forms to transmit the engine power without material loss, the effect is the same as adding a huge weight which brings loss in tires, fuels and otherwise, while the lowered power output makes hill climbing and the capability of handling the load under poor road conditions uncertain. For these reasons, although the orders have doubtless been placed for many months, the exhibits of all companies were surrounded by interested groups during the progress of both shows.

The Covert Motor Vehicle Company, Lockport, N. Y., formerly manufactured a light commercial delivery wagon, but the transmission and jackshaft offered such splendid opportunities that this was given up and the firm specialized in the latter. How well it has succeeded in this could have been noted at either show, providing all the exhibitors displayed a chassis so that the transmissions were visible. The jackshaft combination form is receiving equal support from the commercial vehicle manufacturers. This is seen in the accompanying photograph, which details the case used, the gears and shifting mechanism, as well as giving a very good idea of the proportions of the case. This is a very compact unit and fairly light in weight, although heavy enough for the work. Any form of bearings may be specified.

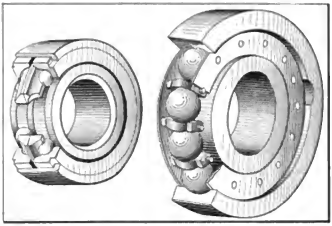


COVERT TRANSMISSION WITH COVER REMOVED

The Timken roller bearings illustrated on the opposite page are too well known to require any comment. It should be sufficient to say that all bearing forms are divided into three classes, the ball, straight and tapered roller. The Timken concern is the leading exponent of the last type. This company produces a tapered roller with a shoulder at each end, these being guided by a corresponding groove in the races. The whole is held together in a cage. The length has been criticised somewhat, hence for a number of special purposes requiring a short form the concern has a new short series with but one shoulder. The bearings are adapted admirably to take thrust in combination with radial loads.

The axles made by the Timken-Detroit company embody a series of standard designs in which are incorporated the parent company's bearings. These include all sizes, from the smaller delivery wagons to the largest trucks, and are made in both chain and shaft drive rears and I section fronts. A cut on the next page illustrates a standard double chain driven rear with radius rods, brake drums, jackshaft and its brake drums, etc.

The Sheldon Axle Company, for many years a leading producer of carriage axles, has turned to the automobile



TWO SPECIAL BEARINGS, NEW DEPARTURE DOUBLE ROW AND SCHAEFER

field and, bringing all of its long experience to bear, is producing a superfine product for both pleasure and commercial cars. In the latter line, four sizes of I-beam front axle are made and rears to match. This gives a range of capacity from 2000 to 7700 pounds.

The New Departure Mfg. Co., among other things produces a line of double row ball bearings so constructed as to resist thrust and radial loads equally. These have been redesigned recently, with a view of making their assembly and demounting more easy. To this end the inner ring upon which the balls bear, the cone ring, if it might be called that, has been made in two parts, the split running circumferentially around the metal. One size of these bearings—they are made in a great variety of sizes—is shown in the accompanying sketch.

In the Schaefer bearings the claim is made that 92 per cent. of the raceway is utilized by the method of separating the balls. As will be seen in the sketch herewith, the separators are very thin and have a pin at each end which joins them to the inner and outer walls of the raceway. This makes a bearing which is very thin as compared with the size of the balls, as well as comparatively light in weight.

Hess-Bright ball bearings, known in Europe by the name D-W-F, need no comment; their design, workmanship and material have placed them at the head of the list in this field. The branching out into truck work is but an incident thereto, in that a well made heavy type of bearing is suitable to any form of work up to its maximum capacity. At the recent Garden show this firm occupied its usual position, the stage in Concert hall, where a full line of all different types and sizes were displayed. The sketch below indicates both thrust and radial forms applied to the steering gear of a five-ton truck. In this bearing the design and method of assembling bring about three desirable and important results.

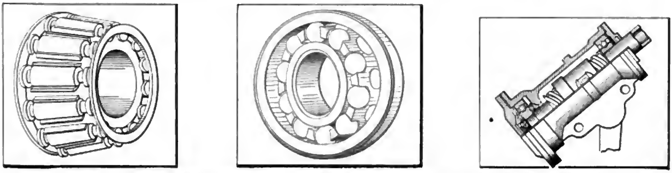
1. The bearings endure end loads, because there is no point in either race at which the balls might fail to receive sufficient support, either when new or after slight wear has taken place.

2. Because there is no possibility of a ball meeting the inner end of a filling slot, it is unnecessary to assemble the bearings as snugly as if filling slots were present; a slight play is purposely allowed between the inner and outer races. Such play as this is inevitable in any bearing, after a certain amount of wear has taken place. In Hess-Bright bearings it entails absolutely no injurious consequences, for the reason just mentioned.

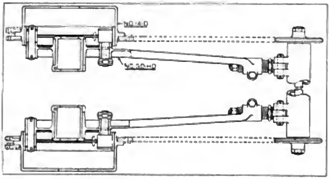
3. A slightly loose bearing, such as Hess-Brights, is preferable to a snugly fitted bearing, for several reasons. There is always some chance of misalignment in the shaft, due either to springing of the shaft itself or to distortion of the housing; for example, an automobile transmission case when power is being transmitted or when going over a rough road. A loosely fitted bearing adapts itself to such distortion, whereas a tight bearing would soon be destroyed by wedging of the balls. The loose bearing is better also for end loads, since the balls have a chance to ride up slightly on the curved sides of the races, like a bicycle on the turn of a banked track, thus escaping the extreme wedging action which lack of freedom would entail. A third point is that, when the inner race is made a press fit on a shaft, it is stretched slightly thereby, and if not fitted loosely at the start it will tend to crush the balls.

Muncie axles, jackshafts, transmission, sprockets, brakes and brake drums are utilized in a very large number of assembled commercial cars. These parts were displayed to good advantage in the recent Garden show and made an excellent impression. The gearsets are made in several types, both planetary and selective sliding gear. These, too, are made as a unit with motors, with countershafts or may be had as complete individual units. By manufacturing so many units entering into the rear construction, this firm is in a position to give an assembler everything but axles, wheels, frame and motor. The planetary form may be had for vehicles of one to two loads and from 20 to 40 horsepower, while the sliding gear type is constructed in larger units, from one to four tons and 20 to 60 horsepower.

Steel castings for truck axles are produced by the Michigan Steel Casting Company of Detroit. In favor of these it is said that they are easy and soft to machine, causing no trouble on that score, are smooth and clean-



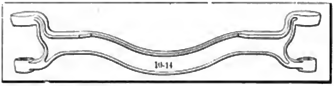
THREE NOTABLE BEARING PRODUCTS, TIMKEN ROLLERS, S-F-K BALL AND HESS-BRIGHT BALL



ONE FORM OF MUNCIE JACKSHAFT AND RADIUS ROD EQUIPMENT

cut, so that extra cleaning is unnecessary, and that the metal is the strongest of all cast materials. It is undeniable that many desirable features could be incorporated in a cast member, providing one reliable and strong enough could be obtained. This field seems to be well cared for by the cast steel products of this company.

The Bower Roller Bearing Company turns out several forms of roller bearings. Most of these are of the straight type and constructed under the Zahn patents. This includes the use of a tapered shoulder at one or both ends and a special flexible cage which permits of considerable radial distortion. The firm is large and well organized with a big, modern factory devoted exclusively to this form of bearing product.



CAST STEEL AXLE FROM MICHIGAN WORKS, SHOWING FINISH

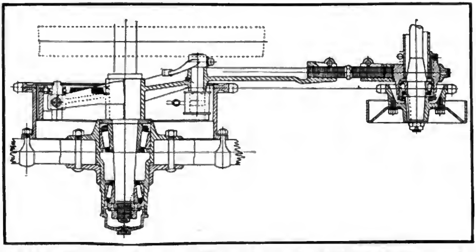
Planetary transmissions in several sizes are made by the New York Gear Works, these being the Ball design. The adaptability of this variety of speed reduction gearing to heavy trucks is illustrated best by the example of 10-ton Hewitt vehicles in heavy and destructive coal handling service. Aside from being the largest and heaviest regularly catalogued, the service which these must undergo is of a punishing character, and the mere fact that the transmissions of the planetary type never give any trouble speaks volumes for them.

Sprockets and differential gears as made by the Cullman Wheel Company, Chicago, form an important part of the rear construction of trucks. By specializing in these two units, this firm has built up a large trade. The differentials are of either the spur or bevel type.

Among the many exhibitors of bearings may be mentioned the Rhineland Machine Works Company, New York City. Ball bearings with self-aligning rings, double-acting thrust bearings and radial bearings are being shown. These bearings are made in all sizes to meet all requirements. All radial bearings have a special form of separator for holding the balls. This separator is a metal ring, with a cavity for each ball and having crescent-shaped tongue pieces which are bent over the balls when in position and hold them in place. A new feature is the self-adjusting form, which drew much favorable comment.

At the booth of the Standard Roller Bearing Company, Philadelphia, roller bearings in all sizes and forms were displayed. For automobile purposes the company features its taper roller bearings, grooved ball thrust bearings and annular ball bearings. The first of these is a new bearing and has solid tapered rollers with races and cones of special steel, the temper being drawn, making them tough and preventing them from chipping or breaking under severe service. The stamped retainer is of the same general type as that used for several years. The annular bearing consists of inner and outer raceways in the form of two rings of special alloy tool steel, the balls running in grooves. Each ball is carried in a separate pocket, the retainer being formed in halves riveted together.

For a form of automobile or truck construction, the J. S. Bretz Company, which is the importer of the F. & S. ball bearings, has both single and double row annular bearings. There are three types of these for light, medium and heavy loads. The double-row bearing is able to withstand a certain amount of thrust, and wheels so fitted do not require separate thrust washers. Two types of ball retainers are used, the light pressed steel type and the heavier solid type. Both are made in two sections. The lighter type has compartments shaped out to accommodate half of each ball. The rivets which hold the two parts together are placed between the balls. The heavier type of retainer has semicircular slots cut in one side of each half to hold the balls. The two parts are held together by pieces of brass placed in slots which register at intervals around the periphery of both of the halves. This special form of retainer allows the balls to utilize 95 per cent. of the annular space. In the double bearings the retainer is so formed as to hold the balls opposite to one another, semicircular slots being provided for them.



TIMKEN-DETROIT AXLE, JACKSHAFT AND RADIUS EQUIPMENT SHOWING TIMKEN BEARINGS

Magnetos, Batteries and Other Ignition Specialties

BOTH shows saw a booth devoted to the Edison Storage Battery Company, at which new features were made prominent. Among the things noted were the larger cells, types "A-10" and "A-12," rated at 375 and 450 ampere-hours, respectively, for use in commercial trucks of from three to five tons capacity. These cells are similar in most respects to the standard "A-4" cell, but contain a greater number of plates and are built in heavier nickel steel containers. Separator for gas exhaust and filling opening have been combined in this cell, making only one opening besides the terminals in the cover.

The company also exhibited a new cell, the "B-6," having 120 ampere-hours capacity. No radical changes have been made in the construction of the Edison cell during the past year, and it may now be considered thoroughly standardized. The company is now manufacturing large quantities of all standard sizes from 40 to 450 ampere-hours capacity. All cells are now assembled in an improved tray, in which each cell rests on a pressed steel cradle and is held firmly in position by a pressed steel hold-down.

Similarly, the Bosch displays were prominent, the magneto running in a continuous bath of water, yet delivering sparks constantly, drawing a crowd at all times. The exhibit, which was a most representative one of Bosch products, included those types of magnetos fitted to 1912 commercial vehicles and pleasure cars, as well as those for equipment to the 1913 products, which make their appearance on the market during the midsummer. On the latter it was observed that the Bosch company has concentrated attention on rendering the newer forms, which are technically designated Z types, water and dust proof.

If there is one part of a motor truck which goes wrong less than any other, it is the magneto, providing, of course, that it is of perfect manufacture and protected from the elements; hence it was somewhat difficult to imagine how, having arrived at its present high state of reliability and efficiency, the instruments could be improved. In spite of this, the Z types are certainly an advance, both in design and construction, on any ignition system that has yet appeared, and we have no doubt that manufacturers in general will appreciate the practical and thoughtful improvements the newer machines contain, and their special adaptability for use on motor trucks and other commercial vehicles which are called upon to operate irrespective of weather conditions.

Educational indeed was the exhibit of C. F. Splitdorf of coil and magneto renown. A sectional view of the Model F low tension magneto at once discloses and clears up many of the so-called mysteries of magneto construction. The armature, distributor and circuit breaker are in full view, and the owner can see for himself exactly what duties a magneto performs.

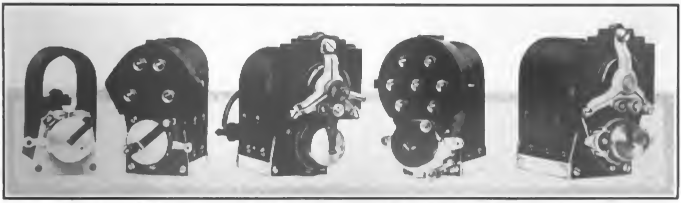
A working model of the largest magneto in the world, weighing 800 pounds and standing nearly four feet high, is another Splitdorf educational feature for layman and wiseacre alike, and induced much comment.

NEW EDISON TRUCK BATTERY

All the low tension models which have made the name of Splitdorf famous are exhibited, but there are new features on exhibition of great interest to the trade in general. The new high tension magneto which is being supplied to the foreign trade, and the new booster type of high tension magneto soon to be placed on the market here, are on exhibition in addition to the new "Splitdorflite," the Splitdorf device for lighting by generator.

Splitdorf innovations on low tension models are chiefly in interior design, more particularly incorporating, as they do, the latest insulation improvements.

Marburg Brothers, New York City, showed the Mea magneto and S. R. O. ball bearings. The latter are made in Switzerland by a concern claimed to be the oldest factory for annular bearings in existence. The bearing shows an uninterrupted ball race guaranteed to be turned out of the solid. The cage consists of two L-shaped



ROW OF BOSCH PRODUCTS AS EXHIBITED AT THE MADISON SQUARE GARDEN SHOW steel stampings riveted together, forming a T-shape; this makes a very strong cage, and as the shape is like a scoop the lubrication is forced throughout the bearing.

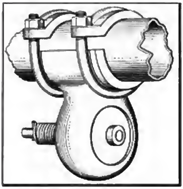
The Marburg-Hagen automobile springs are the third article exhibited by the firm in question. They are manufactured at Hagen, Germany, a place in which carriage springs have been made for many generations. The elastic limits of these springs, which are made out of high carbon steel and not of any alloy, are claimed to be 195,000 pounds to the square inch. Benz and Mercedes trucks are said to be using these springs exclusively. Many other references are mentioned for the same.

The magneto is too well known to require comment, its most notable feature being protection against wind, weather or water interruptions of service.

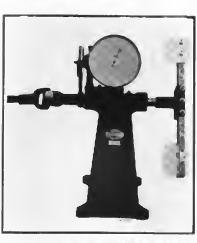
The Pittsfield Spark Coil Company displayed to good advantage its magnetos and other ignition specialties. The United States Light and Heating Company had a large and comprehensive display of its National vehicle batteries, as did also the Gould Storage Battery Company.

Spark plugs were very much in evidence the same as other years. There are many innovations which are attracting great interest since improvements in this little instrument mean much to the automobilist. The greatest trend is toward a number of sparking points included in the plug instead of the single point which formerly marked the general practice. Another interesting development is the transformer plug, in which the low tension current is transformed directly at the plug. Spark plugs which ignite through a stream of lubricating oil are also

Miscellaneous Parts, Lighting, Dyna



S. R. B. MUFFLER CUTOUT



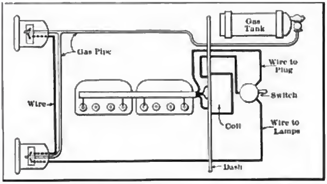
TRACY DYNAMOMETER FOR ENGINE TESTING

This heading would include such a large number of exhibitors that mention of all their products would be impossible in the compass of a single issue. For that reason only a selected few will be referred to herewith.

The S. R. B. Specialty Company displayed the muffler cutout of the same name, as well as Smooth-on outfits, Rapidcut valve grinding compounds and other things of a similar nature. The cutout shown herewith is designed to be attached to any exhaust pipe without removing it from the car, only a saw cut being needed.

Joseph Tracy, the well-known automobile engineer, showed his fan type of dynamometer for testing engines. This consists of a metal pedestal carrying a horizontal steel shaft in ball bearings. One end of the latter is connected to the motor, the other carries a two-bladed fan. A small pulley by means of a belt drives a special tachometer for measuring the speed.

In addition to its bumpers and fenders, the J. H. Sager Company had a new device which attracted much attention. This was its Spark-o-lite equipment for lighting the car. It is a gas-tank method, but with an electric attachment by means of which the operator need not leave his seat to turn on the system. The accompanying wiring diagram shows how it is connected up and gives a better idea of it than words.



SPARK-O-LITE SYSTEM OF WIRING GAS LAMPS FOR DASH LIGHTING

The exhibit of Veeder hub odometers was not confined to the booth of this company, but was to be found all over the building, in practical use on the cars. In the taxicab and commercial car industry, in which up-keep cost has such a vital bearing upon its very being, the hub odometer comes in the nature of a revolution. Oil and gasoline, life of batteries, tire-cost, wear and tear a mile can be accurately figured out to the smallest fraction as every revolution of the wheels, both backward and forward, are recorded. For the dishonest or careless driver the hub odometer truly "measures the miles"—his mileage with taxicab or truck is recorded beyond cavil. For the perpetual but all-necessary "comparative table" the hub odometer supplies the necessary statistics in positive form.

This positiveness, so fundamental to Veeder products, is known to the automobile industry as a whole, and in cyclometers, tachometers, tachodometers, odometers and counters in general, the Veeder Manufacturing Company takes a commanding position with manufacturer and user alike.

The Continental Motor Manufacturing Company, of Muskegon, Mich., is manufacturing a new long stroke motor for commercial service, which was seen at the show. Up-to-date approved features are prominent and are embodied in view of meeting the most exacting needs of the commercial vehicle manufacturer.

This motor, known as "Model E," is of the true long stroke type. The cylinders are of 4.5-inch bore with a 5.5-inch stroke. Great care has been exercised through shown, as are those which are arranged with glass windows. The stories of the exhibits follow.

Autoparts Manufacturing Company, Jersey City, N. J., showed the E. Z. quick detachable plug which requires no wrench for adjustment. It has no metal-to-metal points and asbestos packing prevents leakage of compression. The core is interchangeable.

Benford Manufacturing Company, Mt. Vernon, N. Y., displayed the Monarch plugs made by this company—these comprising eight models, two porcelain and six mica types. The leader of the line is the Monarch magneto plug which has a very heavy core to insure perfect insulation. The firing-points are constructed in the shape of a star to secure constant firing under all conditions. This plug works with either magneto or batteries.

Bosch Magneto Company, New York City, showed plugs in addition. There are no radical changes in the general construction of the high-tension plugs this year. The steatite insulator is of great strength and the plugs are made gas-tight by assembling the parts under heavy pressure. The ends of the three sparking-points have been changed to a crescent shape producing the spark.

In the exhibit of the Champion Ignition Company, Flint, Mich., were shown the AC Star plug which has a very short, heavy porcelain and a metallic gasket with a knife edge. The heavy porcelain makes the plug very strong and durable and the gasket prevents leaking. The company also shows the AC Standard plug and the AC Waterproof in which a porcelain, secured by a clamp, protects the connection from leakage or water.

mometers, Speedometers and Motors

its design and construction to make this motor strong, durable and reliable. In doing this, however, simplicity has not been overlooked, and the reader will readily see from the reproduced drawing that this motor is exceedingly simple and accessible. This, showing the valve side, gives an excellent idea of the enclosed valve mechanism and the ease with which the side plate covers can be removed, the exhaust and intake manifolds being carried high up on the cylinders so as to cause no interference. These valve chamber covers keep the valve mechanism free from all dirt and dust as well as make the motor operation almost noiseless.

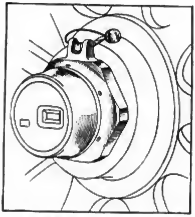
The crankcase, which is made from a high-grade nickel aluminum alloy, is of the split type, to give easy access to all the adjustable main bearings. To accomplish this only the oil pan must be removed. The split bearings are carried in the upper half of the crankcase and looseness or wear of bearings can be taken up without the necessity of taking off the cylinders. This is done by the removing of thin sheet steel liners. All the bearings are made of genuine nickel babbitt. After being fitted into place these bearings are expanded on special expansion arbors, reamed and hand scraped.

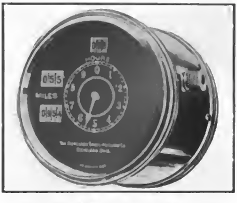
Merchant & Evans displayed the Evans transmission, universal disc clutch, new grease cups, tire case and a number of other specialties. The clutch, transmission and other chassis parts were assembled on a pressed steel frame and gave an excellent idea of this company's facilities for furnishing parts to the assembler of commercial cars. The Hele-Shaw disc clutch, which is imported, is being adopted widely for commercial truck use, due to its simplicity and efficiency as well as long life of the plates.

Among other motor displays the Rene-Bois engine or, as it is now called in this country, the Sphinx, was notable. This has a reciprocating sleeve valve around the upper combustion chamber, operated from a shaft on the side of the cylinders. Since the single sleeve takes the place of a pair of valves and insures positive timing during the life of the engine, it has many advantages as will be apparent.

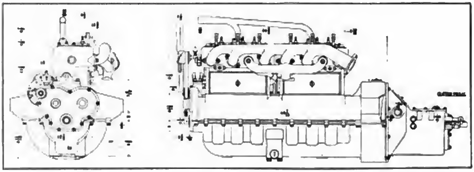
The Rutenber motor, with which many commercial vehicles are equipped, was also shown. This is displayed to good advantage in the accompanying reproduction of a sectional drawing and shows the individual casting of cylinders, form of crankshaft and bearings, as well as other parts.

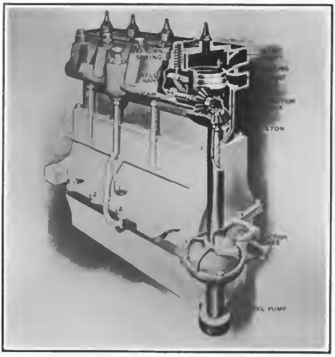
A number of other parts makers were present at the Garden, with engines, transmissions, clutches and similar parts, including the Wisconsin Mo-


THE VEEDER HUB ODOMETER NOW WIDELY USED

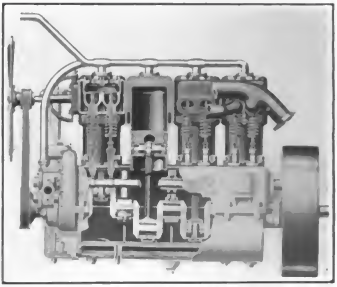


CLEVELAND SPEED INDICATOR, A NEW RECORDING DEVICE


LINE DRAWING SHOWING PROPORTIONS OF NEW LONG-STROKE CONTINENTAL MOTOR



SECTION THROUGH SPHINX SLEEVE VALVE MOTOR



RUTENBER COMMERCIAL VEHICLE ENGINE IN SECTION

tor Mfg. Co., the Hazard Motor Mfg. Co., the Warner Gear Co., the Brennan Mfg. Co., the Spicer Mfg. Co. with universal joints, the Peck Wheel Co. with a new spring wheel and a large number of carburetor firms, chief among which were the Stromberg Motor Devices Co., Wheeler & Schebler, Byrne Kingston & Co., Excelsior Needle Co. (Excelsior) and several metals and material firms. The American Vanadium Co. showed vanadium metals in various automobile and truck parts, Billings & Spencer all kind of forgings and other firms their products.

Chains, Springs and Steering Gears

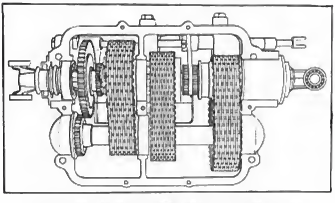
ONE of the novelties in the way of driving chains was the latest product of the Whitney Mfg. Co., which showed a silent form with advantages over both roller and block types.

The construction of this chain is such that the sprocket wheels used in connection with same need not be flanged nor grooved, thus gaining the entire width for wear. This is accomplished by means of guide plates, which are a part of the chain, as will be noted from the accompanying illustration. The guide plates are connected by outside members, which give added tensile strength. The links are so assembled that each joint has four wearing surfaces, making a very long-lived chain. Hardened steel bushings are forced into the guide plates by machinery so that they are held fast and cannot turn.

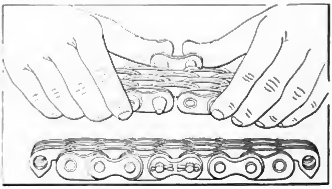
The steel links turn about the outside of the hardened steel bushings and the hardened steel rivets, which are also forced into the outside plates, turn within the hardened steel bushings.

These chains are made in various sizes and pitch and also various widths to suit requirements and are used for driving magnetos and camshafts on gasoline engines, machine tools, line shafting, motors, generators, pumps, and also in transmission for speed changes on automobiles.

S. Huffnung & Co. devoted most of its stand to the showing of Coventry silent chains, imported from England. One application of this is to gear boxes where its use in place of meshing gears results in a noiseless transmission and one of high efficiency. One of these is



COVENTRY SILENT FORM OF CHAIN USED FOR GEARBOXES



NEW WHITNEY SILENT CHAIN SHOWING EASE OF ASSEMBLING seen in the sketch herewith, three chains being used.

The Diamond Chain Co. showed its line of roller and block chains, of which one size is illustrated on this page. These are in wide use for final drives on commercial cars, relative to which the company is conducting a wide campaign of education in the matter of proper lubrication and enclosure.

Steering gears and chains were displayed by the Baldwin Chain & Mfg. Co. The latter are of the roller type, with easily removed side plates, while the former is a new type, the Brown, which does not include any gears, a shifting eccentric which has no backlash being substituted.

A large exhibit of steering gears at the Palace marked the Gemmer booth. At this were shown Models O, K and C for pleasure vehicles of 3,000, 4,000 and over 4,500 pounds weight, and O-2, K-2 and R-2 for commercial cars of a rated load of 1,500, 2,000 and 6,000 pounds or over.

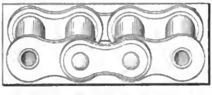
Very close by was located the stand of the Roos Gear & Tool Works, a natural competitor. This firm has a special design of worm and worm, one within the other, which has been very successful in both heavy and light work. The sketch on this page shows one size of this, from which the equipment of a large number of commercial cars will be recognized.

Springs were well displayed by several different makers. The showing of the Cleveland-Canton company, which included special vanadium, silico-manganese and other alloy steel members, was notable. These are made in all sizes and styles, and are being adopted by a larger and larger number of commercial vehicle firms as the advantages become more apparent.

The Perfection Spring Co. also showed many forms in special steels, most of which have been developed by this concern after considerable research work into the desirable alloys and the qualities resulting from their use.

The Tuthill Spring Co. is a larger Western firm, which has made a specialty of vehicle springs for many years. This concern does not go into the alloy steels to the extent others do, claiming that its special processes of hardening and tempering spring steel bring out the qualities required. It has been very successful in motor truck work.

Harrison, Fedders, Mayo and other manufacturers of the best grade of radiators were on hand with a showing of their wares, although it is a fact that such firms do not do any business at the shows, all yearly contracts having been signed months before. They do, however, boost the general show proposition with good results to all concerned, and a show from the public standpoint would be a poor one without them.



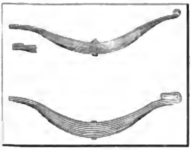
SECTION OF DIAMOND ROLLER CHAIN

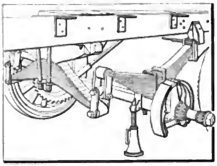
Greases, oil and other lubricant and lubricator firms were present also, as usual. The exhibits in all these cases consisted of a showing of their products, which is more or less difficult to describe. Each brand of oil and grease or form of lubricator has its special features, which commend it for everyday use.

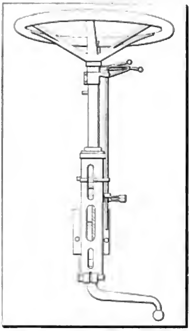
The gasoline and oil storage companies were represented as well, this being an accessory which appeals more strongly to the car buyers and owners for garage and service building uses. The Hydraulic Oil Storage Co. was one of those present with its measuring system. This firm displayed for the first time its coin controlled machine for selling gasoline. This machine is the last word in hydraulic gasoline storage and delivery. To draw gasoline one simply deposits a coin in the slot in the machine and trips a valve. The machine then delivers automatically one accurately measured gallon of gasoline for every coin thus inserted—a gallon of gasoline that is measured exact to the dot. To review the possibilities of this machine would consume a fair-sized volume. It is simply another demonstration of modern genius and mechanics.

The A. O. Smith Company, Milwaukee, was scheduled to exhibit the new truck at the Palace, but this was not finished in time. Instead at both shows there was shown the selective, three-speed transmission for cars of 25 to 50 horsepower which this concern makes. Imported annular ball bearings are used. The sliding gear shaft is of high-carbon stock, hardened and ground. It is square while the countershaft is round, of open-hearth steel. The pinion and transmission shafts are tapered.

In the exhibit of the Warner Mfg. Co., Toledo, two sizes of selective transmissions were shown, in both rear axle and sub-frame types. The smaller is for cars of 30-35 horsepower and the larger for cars of 40-50 horsepower. Both are of the three-speed selective type forming a unit with power plant and three-point suspended.







VARIOUS COMPONENTS OF COMMERCIAL VEHICLES, LEFT TUTHILL SPRINGS, CENTER CLEVELAND-CANTON SPRINGING, RIGHT ROSS STEERING GEAR

Impediments in Introducing Trucks*

Speeding the Horse Driver Up to the Pace of the Motor Vehicles Is One of the Big Problems to Be Wrestled With—Methods of Handling Small Packages, Fruits and Crates—Problems That Work for General Economy Loss of Time Is the Fatal Impediment—Conclusion

By HAYDEN EAMES

TO the credit of the owners I must say that they finally looked into it, and the difficulty was properly remedied with correspondingly successful result. This was, of course, an extreme case, and unusual in the use of the boys, and the sorting of the packages on the ground; but the shipping-room arrangements were by no means unusual. In fact, inadequate loading or unloading facilities are almost universal. The simple convenience of a ready-loaded crate to slip into the wagon upon arrival is most uncommon, and such suggestions are almost invariably resisted—not for any reason, but because we haven't been accustomed to do so. It sometimes happens in large shops that packages of a certain large classification are of a size and character which admit of their delivery through chutes to the shipping room. It is almost invariably the case that by a slight change in the arrangements the sorting of these packages according to wagon routes can be made once and for all on the floor where and when they are put in the chutes. But, as far as I know, it has, heretofore, proved impossible to induce anybody to do this, although I have yet to hear a valid objection offered to it in any case, and yet the delivery manager of such an organization often calls himself a business man, although he unhesitatingly keeps the most expensive unit of his investment standing idle, apparently, for no other object than to relieve the strain on his own ingenuity.

Many of these requirements could be made to improve the horse service if the horse himself had the endurance to stand it—a point that is frequently overlooked. As has often been said, there is no watt-meter on the horse, and, in consequence, he is generally worked more or less beyond his normal capacity, the loads and routes being more or less subconsciously selected to that end. To save this loading time, therefore, means to cut down the horse's rest, without which he cannot do the work assigned him, but the power wagon *needs* no rest in the same sense, and it is a large enough investment to make it desirable to conserve this time.

In considering this general question of reducing delays and loading times, it is often overlooked that the day's mileage is a rough measure of the work performed by a unit in a given service. An hour's delay on a five-ton horse truck, averaging say 2.5 miles an hour, may be a large percentage of a day's work in that unit, but measured in dollars it represents only a third of the loss represented by a similar period of idleness in a five-ton power wagon whose average running speed is 7.5 miles per hour.

It is very hard to persuade the average user that the idle periods in the day's work in any way affect a comparison of the draft-animal and power wagon or the relative costs.

The reactionary effect of external conditions goes deeper, and is far more nearly universal than the mere lack of facilities in individual establishments. For example:

The dimensions of many of the down-town alleys in Chicago put a definite limit on the truck dimensions that can be used therein, and nearly all trucks working in that part of the city load or unload in the alleys. The peculiar arrangement of the railroad freight yards in Chicago curtails the efficiency of all methods of highway transportation to such a degree as to greatly dwarf the question of their relative advantages. Those who have investigated this particular case closely state that it is no exception to the rule that the conditions can be perfectly well met by a rearrangement of these yards with direct reference to the use of automobiles with a probable improvement or 150 or 200 per cent. in their loading and unloading capacity. It is reported that the railroads themselves are alive to the situation and are approaching the solution in a more or less dilatory manner with an entire ignorance of the expert knowledge that is available on this subject in the automobile field.

There are many analogous cases throughout the country; many of them can, probably, be partially met by special portable loading apparatus of one kind or another applied to the trucks themselves. Next to the increase of factor of safety on operating cost to be obtained by improvement in tire maintenance on the heavier trucks, there is, perhaps, no single field in which the designing engineer, strictly so called, could play as large a part in developing this business as right in this field of portable loading apparatus and the design of trucks with reference to special service. This is one of the few departments of automobile knowledge in which there is anything yet to be learned from draft-animal practice or, rather, from the practices that existed during the draft-animal period.

Up to date the handling of fresh small fruits at automobile speeds has almost invariably entailed loss, and it is ridiculous to suppose that a little ingenuity properly applied would fail to meet this case immediately in which the improvement in speed and certainty offered by the power wagon gives the fruit handler a most obvious gain.

Nearly all the cotton in the Gulf ports and throughout the South is handled by negro roustabouts. It is fairly cheap and hard to beat for economy, but it is uncertain and sometimes too slow.

The condition has been partly met by the extension of railroad spurs; but about two years ago I knew of a very considerable order for electric five-ton trucks that was lost because portable jib-cranes could not be applied to them in season to meet the conditions.

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*Paper read before The Electric Vehicle Association of America, October, 1911.

More could, of course, be said on this subject, but the examples are sufficiently indicative of the class. In the work of development in this direction there is still a little to be learned from the practice which prevailed in draft-animal vehicles.

Mechanical ignorance on the part of prospective users, of course, has got to be expected. At least in the electric field no one is in so fine a position to cope with this as the central stations, and many of them are doing yeomen's service in this direction; but we all remember the time when it was otherwise.

The first considerable installation of electric vehicles in this country was almost ruined because the central station manager in that particular instance looked upon the vehicle user as legitimate prey. It was an interesting thing to walk into the charging station at night and see a long row of red hot cast-iron rheostats through each of which a vehicle battery was being charged in two groups in parallel and to know that the current was being obtained from a 110-volt direct-current circuit which was being metered at the customer's expense nearly three-quarters of a mile away. Even a persistent horse user cannot fail to sometimes discover something. He may have a nephew just from college. At all events this enlightened proceeding caused the user to put in his own gas engine and generator and in consequence cut the monthly cost of current per vehicle from $38 to $5.50.

It is hard to believe to-day that such a company, or such people, or such action could have belonged to an organization which is probably to-day doing more far-sighted work in the introduction of power wagons than any association anywhere, and many of whose members were even at that time actively alive to the prospect.

There are, of course, many minor considerations which tend to retard power-wagon introduction, and some of them are of a very isolated character. For example: One user of electric livery wagons in New York still uses many horses, and he probably will as long as there is a sale for high-grade coach horses, because he raises them and uses his wagons to break them in. This particular firm needs no instructions from anybody. They are as well informed on the economy of delivery, and as well organized, and as unprejudiced, as any wagon user we have come in contact with.

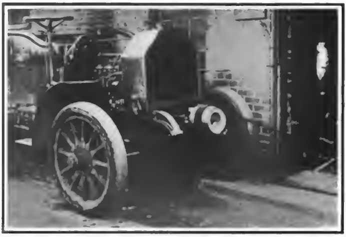
Then there is always the reactionary or interested delivery manager. I have in mind a case where electric trucks came to grief very largely, but not entirely, because the man in charge of them received a personal compensation for every horse wagon he was obliged to employ in excess of the electric installation. As a result of this situation an electric truck averaging about 7.5 miles an hour round trip by cyclometer found itself unable to deliver *any more goods a day* than a horse vehicle of the same capacity averaging 2.5 miles per hour round trip by cyclometer. Whenever, as in this case, it looks as though the laws of nature were suspended to the detriment of the power wagon, it is a pretty certain indication that something of this kind is to be looked for. But apart from these minor, but almost universal, considerations, which occur in endless variety, the principal obstacles will be found to be practically limited to those discussed more at length in the above paper.

The whole question of the rapid introduction of the power wagon to-day is one of public education. We have no right to look for any engineering advance so overwhelming as to relieve this condition in time to be of any great service in the work. The general lines along which experience has indicated this education to be necessary I have endeavored to set forth above. No associations, no corporations, no individuals are in such a position to force this education as the central stations; and no one whatever, except possibly the team users, is likely to reap as great an ultimate profit by it. The liberal manner in which this central-station business has been conducted during the last few years and the local newspaper advertising involved thereby mean the availability of the press for educational purposes to a degree even greater than that justified by the public interest in the question.

The association seems to be thoroughly alive to this situation and we have a right to hope that the next year will see results.

UTILIZING TRUCK AROUND FACTORY

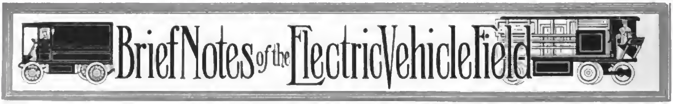
While not a frequent occurrence, it is a fact that the power supply of a factory is shut off occasionally. In those cases the firm is in the best position which possesses a commercial car, for this can be pressed into service as a source of power, temporarily. A few days ago the Avery Company's wagon factory in Peoria, Ill., closed down for inventory, during which the engine was repaired. Among other things it was necessary to rebore the steam cylinder. Obviously, an outside source of power was required.


AVERY TRACTOR SUPPLYING POWER FOR MACHINE TOOLS

In this emergency the three-ton Avery truck used for hauling was idle temporarily and was pressed into service. As the accompanying picture shows, it was placed alongside of the machine shop door and the drill press in which the work was done driven by means of a belt. This is an excellent example of what might be termed the versatility of the Avery city and farm tractor.

UNIVERSAL MOTOR TRUCK PLANT SOLD

Howard W. Walton, of New York City, has acquired possession of the Universal Motor Truck Co., of Detroit. The transfer was made recently and the members of the company disposing of their interests to the New Yorker are C. H. Habercorn, C. B. Cubertson, A. Kling, A. E. Barker, G. Uhlein and L. Camper. The capital stock of the company was $350,000, and the plant is located at Theodore and Duquindre streets.



Brief Notes of the Electric Vehicle Field

Has the Electric Arrived ?

In an address by this title before the Electric Vehicle Association at a recent meeting in New York City T. C. Martin and his son, K. G. Martin, delivered a critical analysis of the electric situation, in which were a number of severe criticisms of this type and the men who are pushing it. Excerpts from the paper follow:

It would be much easier to answer the inquiry in the title of this paper if comparative data were available from time to time, and the information should not be difficult to obtain. Meantime, the fact may be here recalled that according to the results developed by the inquiry of 1909 about 250 central station companies were then supplying electrical energy to automobiles, earning perhaps about $500,000 a year from 8,000 to 10,000 machines, at an average of $50 to $75 per year per machine. If it could be assumed that there were then 10,000 machines or 12,000 machines all told in the country that would give us a basis of calculation as to present conditions as to the industry as a whole.

If the question were put: "Has the hydrocarbon automobile fully arrived?" the answer would be a very decided "No!" and it follows as a corollary that, however well satisfied we might be with the status of our own art, the electric vehicle can never reach perfection while it has this formidable rival in the field to measure up against. The records of the patent office, the results of trial runs, the pages of the automobile papers, the annual exhibitions, and our own daily observation all prove to us that the gasoline vehicle is still undergoing a splendid evolution.

It is not unlikely that very few of us realize the possibilities before the manufacturer of electric pleasure and commercial vehicles and their constituent parts. The opportunity has always been there, but apparently it has been necessary for the gasoline car to show the way and do the pioneering work in many branches of the automobile industry. The reward, however, has been great, a reward that can just as well come to us if we but put ourselves to the task as did the other fellow. We have begun an organized and definite campaign rather late, but there is no reason why we should not see at an early date the electrically driven vehicle in its proper place.

It is true that we have made great technical progress of recent years, but an average of electric cars would show characteristic features that were abandoned by gasoline car makers long ago; and yet we are constantly striving to cover the entire field of the gas car, and do all that it can do, as swiftly, as surely and more safely, and with absolute assurance of ultimate success. In the meantime we do not progress as rapidly as we should, because makers employ obsolete and superseded methods in the worst cases and poorly designed systems in the average.

Vehicles of this type handle United States mail between post-office substations and railroad terminals, etc., penalizations being imposed for any delay over two minutes. In two years these wagons, one always in reserve and one being overhauled, covered 689,819 miles, this being almost 40 miles per day per vehicle, counting the whole 26. In summer the mileage is minimum, reaching its maximum at Christmas, when the wagons are often in continuous service the whole 24 hours, changing drivers and batteries every eight hours. The total loads carried at this time are five times the actual capacity of the wagons. For this extraordinary "limit" service the cost has proved to be for:

	Tires a mile.	Lead Batteries a mile.	Current at $.04 a KWH.
1,000-lb. wagons	$.0076	$.0221	$.0211
2,000-lb. wagons	.0103	.0260	.0224
4,000-lb. wagons	.0218	.0404	.0258

Total average cost of tires, batteries and current......$.0658

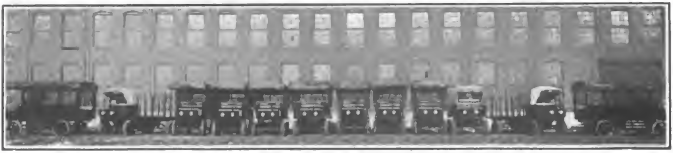
Three makers of tires and two makers of batteries figured in this compilation. The current was all central station Edison service.

There awaits a large field to the successful builder of a convertible vehicle, not one that needs changing bodies or weighty additions, but one that offers weatherproof protection to the occupants and is instantly available at any time. The recent tendency toward a lowered center of gravity is to be much commended, as it is a step in a rational and forward direction.

One of the problems that came to the attention of the authors this summer, as it must have done to many others, is that of ability to supply sudden or "rush" orders. There has been an insuperable difficulty in prompt supply. To what extent the solution of this problem lies in the present or the future one can hardly say.

The recent figures of the Census Office show that in 1909 there was an output of automobiles to the value of $250,000,000. It is now perhaps far in excess of $350,000,000. In the same year, it is reported, the value of the 3,000 electric vehicles produced was $6,564,500, or 163 per cent. more than in 1904. It will be 1914 before authentic Government figures are again available, but we all know that even since 1909 the whole industry has grown enormously and the electric end of it very remarkably. Inquiry would go to show a total value of electric vehicle output at the present time of $40,000,000, and it has even been put by some authorities in excess of $50,000,000.

The electric vehicle is to-day by far the most rapidly advancing branch of electrical industry. General statistics over about 40 years go to show an average rate of growth in the electrical industry of 20 per cent. a year, or double the rate of the



LARGE FLEET OF GENERAL VEHICLE ELECTRICS RECENTLY PURCHASED BY U. S. GOVERNMENT FOR NAVY YARD USE

BEAVER ELECTRIC WAGON OF 1500-POUNDS CAPACITY. A NEW DENVER PRODUCT

country and of industry as a whole. The electric trolley, or railway art, has an annual growth of about 10 to 12 per cent., and this has been slightly bettered by telephony, but electric light and power has in all except dull years and periods of panic maintained a rate of growth in excess of 20 per cent. But, as we see, the electric automobile has a rate so far in excess of all this it is hardly reducible to a comparison. Maybe we are now, as sailors say, "pulling in the slack," and cannot determine real advance till the rope is taut. Such tremendous growth is at once our encouragement and our peril. In spite of frightful setbacks, due to reaching hasty conclusions from uncertain experiments, the industry has in reality forged steadily ahead, and the men who have contributed to such happy results as now confront us on every hand are entitled to our heartiest praise and our warmest admiration.

Baker Company Retains Kennedy

The Baker Motor Vehicle Company, Cleveland, O., has recently secured the services of William P. Kennedy, the well-known consulting electrical engineer, of New York, who will act for that company in the capacity of superintendent of the bureau of service efficiency, the purpose of which is to guide the prospective buyer of motor trucks to the proper solution of his particular transportation or delivery service problem.

Mr. Kennedy has for some time been definitely affiliated with the Baker company as its consulting transportation service engineer. The new responsibility which has been put upon his shoulders places him at the head of the Baker transportation efficiency department. This will be but a more definite carrying out of what always has been one of the basic principles in the company's affairs. It always has been expedient and necessary to the best interests of the buyer and manufacturer, before an absolute guarantee of the electric truck's economy or efficiency over the horse-drawn type was given, to make a thorough study and analysis of the service in question, thereby establishing each installation upon a true scientific basis. The strength of this department will be increased materially by having connected with it a man possessing such a broad and intimate knowledge of the possibilities of the electric motor truck. By virtue, also, of Mr. Kennedy's broad experience and deep knowledge the possibility of error will be eliminated.

Large Repeat Order for Government

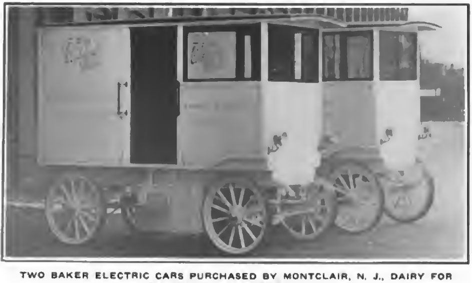
One of the pictures herewith shows a large fleet of 12 General Vehicle electric trucks recently delivered to the United States Navy Yard. These vehicles were photographed just outside of the Long Island City factory of this company, and form but a portion of the Navy Department's total equipment. Of the previous orders the General Vehicle concern also had a large share. The vehicles are divided into two capacities, four of five-ton and eight of a special 2.5-ton size. These are to be distributed around the country as follows: Mare Island, Cal., two; Norfolk, Va., two; Charleston, S. C., two; New York City, two; Boston, two; Portsmouth, N. H., one, and Puget Sound, Wash., one. Beside the trucks in government service in the Philippines and Cuba this makes a total of 39 of this make which Uncle Sam owns.

Electrics for Jersey Dairy

In an illustration herein a pair of Baker delivery wagons are shown. These have just been purchased by the Fairfield Dairy Company of Montclair, N. J., and will be used in the delivery of this concern's certified milk. In this work the electric has a peculiar advantage in that the lack of jar or vibration allows the delivery of milk or cream in the same form in which it leaves the laboratory, while as to speed there is no comparison between the amount which can be delivered by vehicles and horses.

Electrics for Lamp Trimming

Following the example of several Eastern electric light concerns, the Fort Smith Light & Traction Company, Fort Smith, Ark., has purchased an electric truck to be used for trimming arc lamps. The large amount of area now covered in nearly all municipalities makes the trimmer's daily route small if he must depend upon a horse.



TWO BAKER ELECTRIC CARS PURCHASED BY MONTCLAIR, N. J., DAIRY FOR DELIVERY OF CERTIFIED MILK

Some Possibilities for Electrical Trucks

Some Methods of Handling Work in Which the Electric Vehicle Fits Best, with Mention of the Accessories Used and Their Value

THE possibilities of the electrically operated truck for use in the service departments of central stations and other public service corporations are just beginning to be developed, and the effective work which is being done in this connection seems to open the way for still wider exploitation of the use of trucks, especially electrics, in that field.

The immediate advantage of being able to secure charging under favorable conditions is not the chief consideration involved, however, although central station plants and other electric companies would of course be likely to adopt that type of truck as a matter of policy. The chief advantage to be gained is in connection with the operation of equipment which it is necessary to carry on a wagon used in service work.

The Kentucky Electric Company, of Louisville, recently put into service a 1000-pound electric truck, manufactured by the Electric Vehicle Company, of that city. The truck is being used in the general work of making installations, connections and repairs, and a good deal of emergency work is to be done by it. If a break happens, the repair crew, carried in the truck, is dispatched to the scene, and the equipment carried is brought into play immediately.

One of the pieces is an electrically operated blower. This is for the purpose of fanning out the foul air or gases which may have accumulated in the manhole where work is to be carried on. Ordinarily the efficiency of workmen is reduced greatly by the presence of these gases, and sometimes delays have to be suffered because of the impossibility of entering the hole while the noxious vapors are present. By the use of the blower, however, the air can be cleared in a few minutes.

Water in the manholes is another cause of trouble. An electric pump has been installed on the truck, and this is put to work at once when it is found that surface water has entered the compartment and that it has to be drained. This also makes for greater comfort on the part of the men, and better and quicker work may be done.

At night, when emergency repair work has to be undertaken, it has been the rule to carry lanterns, candles or other open flames into the hole. This not only is crude and ineffective, but also dangerous, for sometimes if a gas main near the manhole is leaking there is an accumulation of gas which is likely to explode. In order to avoid this danger, as well as to provide better illumination, the Kentucky electric truck is equipped with incandescent lamps, which can be carried into the manhole, and have proven much superior to the old methods.

All of these electrical devices are used because of the fact that current can be secured from the storage battery which the truck carries. For the purpose of operating the electric pump and blower, a motor is attached directly to the cell, which supplies the current in sufficient voltage to enable the operation of the apparatus without difficulty. The incandescent lamps receive their supply from the batteries of the truck. The consumption of current

URBAN TRUCK MADE BY THE KENTUCKY WAGON MFG. COMPANY, LOUISVILLE, FOR THE ELECTRIC COMPANY OF THAT CITY by these devices means that more frequent charging is necessary, but this is a minor consideration, inasmuch as the expense of operating them is very low.

Louis S. Streng, chief engineer of the Electric company, and Robert E. Hughes, president of the corporation, are much pleased with the truck, which they believe will enable work to be done much more expeditiously and less expensively than heretofore. Inasmuch as quickness is the main requisite in repairing the wires of a public service corporation, the economy of operation is a less marked advantage than the greater facility thus secured. It is likely that additional trucks will be put in service later on.

The public service concern, which is the first corporation of the kind in Louisville to adopt electric trucks, realizes also that by encouraging the use of vehicles of this kind it is indirectly paving the way for business which will accrue later on. It is well known that business men who are considering the use of trucks like to see someone else take the first plunge, and by leading the way the company suggests to many business men in Louisville the possibilities of similar service. If they adopt electric trucks they will, of course, be customers whose business will be of value.

Many street railway companies use trucks for use in repairing wire breaks, and telephone companies also use them to advantage. In many cases gasoline cars or pleasure chassis with special bodies have been used for this class of work. As pointed out, however, the electric form has peculiar advantages in that it has available immediately and constantly a supply of current which can be utilized for the operation of important extra apparatus carried for use in emergency work.

In connection with the public service car it should be explained that the Electric Vehicle Company, the manufacturer, has been absorbed by the Kentucky Wagon Manufacturing Company. The latter has been in the business of making farm wagons for over 30 years, and has an immense plant at Third and K streets in Louisville. Recently it decided to go into the business of making delivery wagons, horse-drawn, and also bodies for motor trucks. Later a deal was made for the purchase of the interests of the stockholders of the Electric Vehicle Company, which established a plant several months ago at Preston and College streets, and the equipment was removed to the wagon factory.

A new building is to be erected and the company will turn out electric trucks on a larger scale than had been planned by the original makers. The cars which were first put out were 1000-pound models, but it is planned to make also one, two and three-ton vehicles. These will be put out as soon as the designs can be drawn and the necessary machinery installed.

Henry B. Hewett, who organized the Electric Vehicle Company and was president and general manager at the time of the merger, has been placed at the head of the motor truck department of the Kentucky Wagon Manufacturing Company, of which W. C. Nones is president and general manager.

TRADE ORGANIZATION IN PHILADELPHIA

PHILADELPHIA, Jan. 19.—With the common object in view of the promotion of the interests of the commercial vehicle dealers in this city identified with the Philadelphia Automobile Trade Association, there has been held during the past fall a number of meetings at the association's headquarters, Broad and Callowhill streets, preliminary to the formation of a truck division.

At these gatherings ways and means for bringing the members in closer touch with each other were discussed and methods suggested by which the consumer could be made to see the light and be convinced that the adoption of the commercial vehicle in place of horse-drawn equipment is the most convincing argument in support of the contention that the elimination of the latter is the solution of the problem of economical transportation.

As a result of several meetings and the discussion of the points raised, the truck dealers holding membership consolidated and formed what has since been known as the truck division of the trade association. This organization comprises 23 commercial car dealers, with H. M. Cole, sales manager of the Autocar Company, chairman.

The members, with the cars they represent, include: J. C. Bartlett, 11 North 21st street, Mais, Walker, Detroit, Waverley; Commercial Truck Co., 27th and Brown streets, Commercial; the Eldredge Company, 1617 North street, Garford; Foss-Hughes Motor Car Co., 21st and Market streets, Pierce-Arrow; General Motor Car Co., 227 North Broad street, Lozier; Carroll A. Haines & Co., 2214 Spring Garden street, Baker; D. Walter Harper, 2534 North Broad street, Cameron; Longstreth Motor Car Co., 257 North Broad street, Alco and Commerce; Locomobile Company of America, 2314 Market street, Locomobile; Mack Bros. Motor Car Co., 640 North Broad street, Mack; Motor Truck Company, 635 North Broad street, Saurer and Decatur; Motors Distributing Company, 336 North Broad street, Kisselkar; North Philadelphia Automobile Station, 3425 North Broad street, Knox; Mitchell-Lewis Motor Car Co., 441 North Broad street, Mitchell; Studebaker Bros. Co., 334 North Broad street, Studebaker; Packard Motor Car Co., 317 North Broad street, Packard; United Motor Philadelphia Co., 216 North Broad street, Alden-Sampson; The White Company, 629 North Broad street, White; The Autocar Company, 23rd and Market streets, Autocar; Automobile Sales Corporation, 144 North Broad street; Peerless; Gawthorp & Wister, 242 North Broad street, Brush; General Motors Truck Co., 664 North Broad street, G. M. C.

ARTISTIC FEATURES FOR CINCINNATI SHOW

CINCINNATI, Jan. 19.—The Retail Dealers' Association annual show committee reports that applications for space at the annual show are coming in more rapidly than expected and that additional features looking to the entertainment of the guests of the association from out of town are now contemplated, including a concert program including vocal selections by artists of national repute. The past shows are to be eclipsed by the event of the week of Washington's birthday and the fact that the association is so fortunate as to have the great Music Hall for show purposes has stimulated the committee to make the event one of social importance as well as an exposition of the progress of the motor world in the Central States. Commercial vehicle manufacturers are coming to the front with applications on account of the importance given this class by the dealers' committee in arranging special dates following the pleasure vehicle show and many more types of this class of cars will be shown here than ever before.

MUNICIPAL VEHICLE SERVICE EXTENSIONS

Economical Form of Apparatus for Towns

A new type of fire apparatus, which seems destined to have a wide field of usefulness in the smaller cities and towns, where finances limit the expenditures, is the motor combination unit with pump, chemical engine and hose space, beside positions for a number of men. One such has just been completed by the Knox Automobile Company, Springfield, Mass., for Willows, Cal.

R. B. Mathews, engineer of the board of underwriters, conducted the official tests for the benefit of the fire underwriters and the city of Willows. The requirement of 600 gallons a minute was easily accomplished, the pump delivering an average of 620 gallons for one hour's duration, readings being taken every minute with the throttle only half open. The same engine delivered 750 a minute on previous tests with 30 pounds pressure on the hydrant. The smooth running of the motor, the absence of all vibration in the pump and the great height to which the two streams of water were thrown received most favorable comment from those witnessing the test. Beside the city officials and members of the fire department, a large number of visiting councilmen and fire chiefs were present and the opinion was freely expressed that the day of horse-drawn steam-pumping engines was passed.

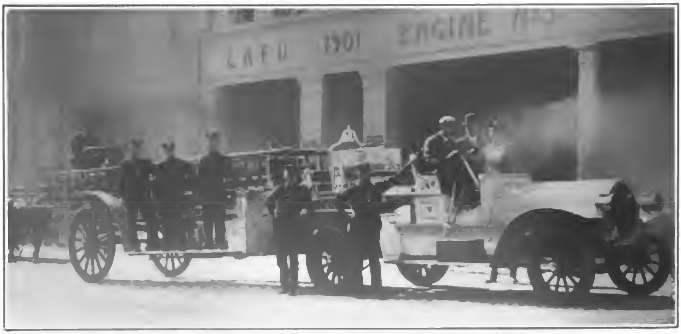
Adopt Motor-Driven Vehicles in Fire Department

Some of the smaller cities of southern California have taken the lead in using modern fire equipment which dispenses with horses. Long Beach, San Diego, Venice and Los Angeles have fallen in line with progressive ideas of fire fighting. The last named city has placed an order for seven vehicles, including an aerial ladder truck of 65-ft. length, combined chemical and hose wagons and a six-wheeled ladder truck which is shown in the illustration. In addition to this, the city has used automobiles for the fire chief and assistants for some time.

The new ladder truck which has just been delivered was subjected to severe tests in the hilly part of the city and met the conditions with ease. This is of considerable importance, as one of the most closely built parts of the city is a hill near the center of town which is covered with wooden apartment houses. The three-horse teams would not be able to reach the top of this hill in anything like the time which the motor vehicles required in the test. Trials for speed were made toward the suburbs and 50 miles an hour developed with ease. This feature is also of importance in a city so widely scattered as Los Angeles. The ease with which the 50-ft. ladder was steered through the busy downtown streets was also a suprise, the long six-wheeler taking the sharp corners of the narrow side streets without difficulty. This truck is shown in the accompanying photograph. It is the product of the Seagrave Company, Columbus, O. The finish of the vehicle is very attractive, being a creamy white color picked out with gold, red wheels and metal parts nickel plated.

Wilmington Has Many Municipal Cars

The people of Wilmington never knew until recently to what extent the commercial vehicle has replaced horses here in the past few years, or to what extent motor cars were figuring in the business activity of the city. The



FIFTY-FOOT HOOK AND LADDER TRUCK, JUST PURCHASED BY CITY OF LOS ANGELES, CONSISTING OF A REGULATION LADDER WITH GASOLINE TRACTOR chief feature of a civic demonstration, headed by the city and county authorities, the Board of Trade and Mercantile Association, was an automobile parade, the purpose being to show the progress of Wilmington, particularly along business lines. The event celebrated was the inauguration of a new and improved lighting system for Market street, the chief business thoroughfare.

Of 150 cars in line nearly half were trucks or other commercial vehicles, including about a dozen in the use of city departments, one being a patrol wagon and another an ambulance. Many of the trucks were gaily decorated, as prizes had been offered for decorations, while most of them were exhibited in such a manner as to show the business use to which they were put, and the showing was decidedly creditable. While a large number were in line, as stated above, hardly half of those in regular use turned out, some establishments not being represented at all, but enough were shown to indicate that Wilmington is abreast of the times in the adoption of the commercial vehicle.

It was the first genuine automobile parade in the history of the city, and it was such a success that it is likely that there will be one on a larger scale, during the day, some time next spring or summer.

Only one prize was offered, a silver loving cup for the classiest truck, offered by the White Company, of Cleveland, and it was won by Lippincott & Co., owners of a large department store, with a Stoddard-Dayton the newest of three of the company's trucks which were entered. Some of the commercial cars were fitted up as floats, while some were applied to other uses in connection with the parade, two Knox trucks owned by the Joseph Bancroft & Sons Company being used for the transportation of bands which furnished music.

One City's Fire Department Weaknesses

In a scathing criticism of the Jersey City fire department's many weak points by the Hudson Inspection Bureau the following pertinent paragraph is noted: The distribution of apparatus is poor in a number of locations. There are points in the principal mercantile and important manufacturing sections that are over a mile from first-alarm companies. A number of the outlying districts are from 1.75 to two miles from first-alarm companies. The apparatus is generally of a satisfactory type, but it seriously lacks proper maintenance and some of it is without modern improvements. The value of light combination service trucks is not recognized for the outlying sections, where long runs, frequently up hill and over ungraded streets, are numerous. Apparatus is not always located in districts where it is most needed; a new 1100-gallon engine is located in a residential district, whereas there are many smaller engines in the principal mercantile and manufacturing sections.

If ever a layout presented maximum possibilities for motor-apparatus installation, this one does. To a motor runs of a mile or two offer no difficulty, although practically impossible with horses as a motive power.

Paterson a Progressive Jersey City

When the balance of its motor apparatus, now building and ordered, is received, the city of Paterson, N. J., will be one of the most advanced in the country in this respect. The new stuff, which has just arrived, includes two converted first-class engines, which will be on 110-horsepower Nott chassis, two hose wagons, an automobile chemical, a converted truck, and several other pieces. With the exception of individual cities in the far South, the metropolitan area, which includes both Paterson and Passaic, will have a greater average number of pieces of apparatus than any portion of this or any other country.

Miscellaneous Notes from Here and There

Following a successful test, the city of Wilkinsburg, Pa., has authorized the purchase of a Knox fire truck.

TEST OF NEW MOTOR-DRIVEN SERIAL LADDER IN SAN DIEGO, CAL.

Racine, Wis., is soon to have a motor patrol and ambulance, this being under construction at the Mitchell-Lewis plant in that city.

Watervliet, N. Y., is advertising for both gasoline-driven and horse fire engines, the former being favored by the committee and mayor.

At its last meeting the city council of Little Rock, Ark., appropriated $4500 for the purchase of an automobile patrol wagon and touring car for the chief of police.

Youngstown, O., has received its new National 40-horsepower patrol wagon, the second to be adopted by this city. The police horses will be turned over to the street department.

Saugus, Mass., received a Christmas present of a Knox combination chemical truck. It is said that half of the forty firemen, receiving $50 a month each, will be eliminated by the new machine, effecting an annual saving of about $15,000 all told.

Following a dispute as to the authority of the fire committee to purchase a combination hose and chemical wagon for the city of Taunton, Mass., near the Rhode Island line, the contract was held up by an injunction after all preliminary details had been settled.

News Notes of the Other, Smaller Shows

OTTAWA, Jan. 22.—The first annual automobile and motor-boat show will be held under the auspices of the Ottawa Motor Car Association at Howick hall, Feb. 12 to 17. The Ottawa Valley Motor Car Association has been active for the past three months in making this show a big success. The decoration scheme which is being worked out now assures the visitors of one of the best-decorated automobile shows ever held in Canada. Thousands of incandescent bulbs with combinations of colors of the motor association will decorate the walls.

Amid such attractive surroundings will be the latest offering of 34 manufacturers of motor cars, representing a valuation of more than $200,000.

LOUISVILLE, Jan 23.—The fifth annual exhibition of the Louisville Dealers' Association, which is to be held in the First Regiment armory, has been postponed from Feb. 21-24 to March 6-9. The 1912 show is scheduled two weeks earlier than last year. Members of the various committees in charge of the display did their work so well in 1911 that they have again been selected to stage the motor show. According to present plans for decorations, the main aisle will be lighted with pedestal electric lamps, imitative of the light standards on the Long White way in this city. The decorative scheme will be elaborate, but all of the details have not been worked out.

BALTIMORE, Jan. 22.—The time for placing applications for floor space at the local motor car show, to be held in the Fifth Regiment armory from Feb. 20 to 28, has elapsed. The list shows that 34 dealers have asked for floor space. Drawings by the dealers will be made on Jan. 22. Applications from accessories dealers will be received until Jan. 24 and for the commercial cars until Jan. 25. The show committee will co-operate with the trade organizations of the city in regard to the commercial end of the show and will help to boom Baltimore as a commercial car center.

ATLANTA, Jan. 23.—The applications for space in the Atlanta Automobile show overran the original estimate of 18,700 square feet by so large a margin that the show committee has decided to sell the space under the seats, and by so doing has increased the available area to 22,700 square feet, all of which has been engaged. It has been decided that it is too late to build a flooring over the seats and exhibitors who have not already secured space cannot be accommodated.

NEWS FROM PITTSBURGH—A THIRD SHOW

PITTSBURGH, Jan. 26—Another old-time carriage manufacturer has joined the ranks of automobile makers. The H. Lange Wagon Company has just announced the organization of a subsidiary concern to be known as the Lange Motor Company. A new concrete factory building with an area of 40,000 square feet of floor space has been erected, machinery installed, and work will be commenced at once on the first season's output of 100 trucks. Truck capacity at the outset will be limited to two styles—one and two-ton.

The new venture does not succeed the old and the H. Lange Wagon Company will continue in the wagon-building business which it founded 40 years ago. The company has been in the motor truck field in this district for five years as agent; handling the Gramm, Dayton and Chase chassis, but building the bodies. The new firm will build the Lange truck and practically all raw material will be supplied in Pittsburgh. The Jones & Laughlin Steel Company has the contract for frame material, the Liggett Spring & Axle Company will furnish the axles, while all the bolts, set screws, rivets and small parts will be supplied directly in Pittsburgh.

The Duquesne Garden show opens here on Jan. 27, the first week being devoted to pleasure cars and the second to trucks. Local dealers are disappointed over this show date as it conflicts with the Chicago show and special models sent to the Windy City were expected here.

The Exposition show continues one week, showing trucks and pleasure cars simultaneously. Elaborate musical features will mark this show. Arthur Pryor and his band will perform afternoon and evening, together with cornetist Herbert Clark and soprano soloist Virginia Root of Sousa's world-tour band and Blanche Mehaffney, the noted concert singer. Manager Thomas I. Cochran reports 152 makes of cars listed for exhibit.

BOARD OF TRADE RE-ELECTS CLIFTON

NEW YORK CITY, Jan. 10—At its annual meeting held here last night the Automobile Board of Trade recognized the successful leadership of Col. Charles Clifton, of the Pierce-Arrow Motor Car Company, Buffalo, by re-electing him president. Reports of committees were heard, all of which showed a healthy growth for the industry. Much good work has been accomplished in connection with good roads, legislation and patent matters.

The officers elected besides Col. Clifton were: C. C. Hanch, vice-president; B. Briscoe, secretary, and G. Pope, treasurer. The directors for 1912 include the officers and S. T. Davis, Jr.; H. Chalmers, S. D. Waldon, W. C. Leland and H. A. Bonnell, general manager. The following comprise the committees for the coming year:

Patents—C. C. Hanch, W. H. Van Dervoort, L. H. Kittredge, L. E. Latta, A. Macauley.

Trade—H. O. Smith, E. R. Benson, W. E. Metzger, C. W. Churchill, W. T. White.

Statistical—B. Briscoe, E. P. Chalfant, J. S. Clarke.

Show—G. Pope, A. Reeves, M. L. Downs.

Legislation and Law—G. H. Stilwell, A. L. Pope.

Intercourse and Arbitration—G. E. Daniels, W. C. Shepherd, J. W. Gilson.

Good Roads—R. D. Chapin, S. D. Waldon, J. N. Willys.

Publicity—A. Reeves, E. R. Estep, H. W. Ford.

Mechanical Co-operation—A. L. Riker, D. Ferguson, F. B. Stearns, C. W. Nash, H. E. Coffin.

Commercial Motor Vehicle Patents

Lent Automobile Fire Engine

The great increase in motor-driven municipal vehicles has brought out a number of inventions of this character. In this one, called an automobile fire engine, the claims include the combination of the usual driving elements with a pump to be driven from the main shaft. This form, however, has the impeller fixed permanently to the shaft and replacing the usual flywheel, so that it will be impossible to run the motor without driving the pump. Of a necessity this would call for another separate engine to drive the car, although the sketch does not show it. 1,010,158, issued Nov. 28, 1911, to Leon B. Lent, Brewster, N. Y.

Tractor with Contractor's Equipment

What is apparently a contractor's tool is the tractor designed by Russell, the subject of this patent. Provision is made for shoveling, elevating, carrying and dumping material. To produce this result the frame carries upright supports which can be moved, while the shovel not only lifts but can be oscillated. The latter is mounted on chains or cables which may be moved in any direction so that the shovel load may be conducted around at will. 1.012,713, issued Dec. 26, 1911, to Samuel J. Russell, Buffalo.

Spring Wheel with Curved Spokes

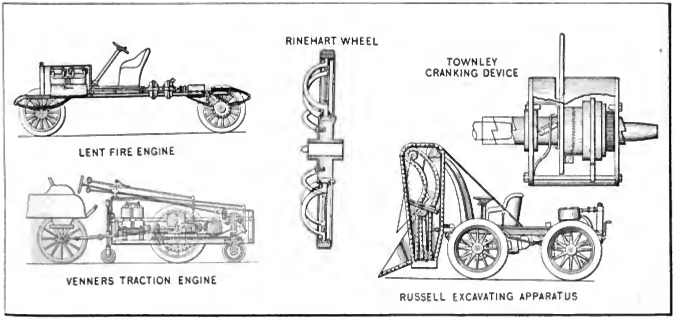
Spring wheels have always attracted the inventive genius, this being particularly so at this time when the growth of commercial vehicle use has opened up an enormous field for them. In the Rinehart device shown herewith the spokes have a curved shape in the plane at right angles to the wheel, the compression of the load increasing the curvature. These are secured to a sleeve sliding over the hub in such a way that the total amount about by fingers projecting from the hub which engage with lugs extending beyond the surface of the sleeve between the fingers. 1,010,689, issued Dec. 5, 1911, to John C. Rinehart, Washington, and by him assigned to the Rinehart Resilient Wheel Company, Alexandria, Va.

Safety Cranking Device of Townley

Self-starting and cranking devices are more interesting to motor truck men than pleasure car manufacturers because of the difference in the caliber of the men driving them. This is a mechanical form of crank in which a slidable member which can be engaged with the crankshaft, a revoluble member which cannot slide. A ratchet mechanism forms the connection between the two and furnishes the slip, when a back fire occurs. 1,011,096, issued Dec. 5, 1911, to William D. Townley, San Francisco assignor to Hercules Auto Starter, Inc., Arizona.

Venner's Traction Unit for Farms

For farm and ranch use the tractor continues to grow in numbers, quality and diversity of work accomplished. The invention pictured on this page was designed to vary the amount of traction exerted when the nature of the surface traveled varies. This is done by a vertical movement of the tractor by means of variable leverage and draft gearing. The patent claims seem to indicate the use of a cam for this, operating on the main bearings of the power unit. In addition a lever from this regulates the load connection. The sketch shows this more clearly than it is possible to bring out the same in words. 1,010,988, issued Dec. 5, 1911, to James H. Venners, Brooklyn, assignor of half to W. L. Millspaugh, of the same city.



LENT FIRE ENGINE

VENNERS TRACTION ENGINE

RINEHART WHEEL

TOWNLEY CRANKING DEVICE

RUSSELL EXCAVATING APPARATUS

INVENTIONS OF RECENT DATE ALONG COMMERCIAL VEHICLE OR ALLIED LINES, SHOWING THE PROBLEMS ON WHICH THE INDUSTRY'S BRIGHT MINDS ARE WORKING

Of Interest to the Motor Wagon Industry

With the Agents and Dealers

The L. A. Mitchell Motor Car Company, Jacksonville, Fla., has received the agency for the Dayton auto truck.

P. A. Brink of Los Angeles has contracted for the sale of Lauth-Juergens trucks in the lower half of California for the year 1912.

The Eisemann Magneto Company has opened a branch in Indianapolis at 427 Meridan street. This branch is in charge of Lon R. Smith.

A. S. Lascelles & Company of New York City has contracted with the Lauth-Juergens Motor Car Company for the sale of these trucks in Australia.

The Leighton & Hancock Motor Truck Company of 16 East Walnut street, Columbus, Ohio, has taken the Sternberg agency for Columbus and vicinity.

The Mutual Auto Company of Duluth has contracted for the Lauth-Juergens line of one-, two-, three- and five-ton trucks in the lower half of California for the year 1912.

R. L. & H. H. Smith Company, of 1008 Commonwealth avenue, Boston, has decided to give up its pleasure car department and devote itself exclusively to the sale of Mais motor trucks.

The Nob Hill Auto Company has secured the agency for the Alco motor trucks, products of the American Locomotive Company, New York City. This new firm will have the state of Oregon distribution.

The Ormond Motor Car Company, of 100 Putnam avenue, Brooklyn, has just taken the Knox agency, handling that manufacturer's entire line, which embodies pleasure cars, commercial vehicles and fire apparatus.

The Charles Behlen Sons Company, distributor of the Locomobile and the Detroit electric, is making extensive improvements to the showrooms at Vine and Fifteenth streets, Cincinnati, and when the same are finished will have a model place of the kind.

The Leyman-Buick Company, heretofore handling the Grabowsky power wagon, made in Detroit, has taken over the sales of the Mack truck manufactured by the International Motor Company at Allentown, Pa.; also the Saurer truck made in Plainfield, N. J., by the same company. Mr. Leyman has just returned from a 10 days' visit to both plants.

Recent Motor Truck Incorporations

Kelly Motor Truck Company was incorporated under the laws of Ohio. The Pennsylvania office is at 4518 Baltimore avenue, Philadelphia.

Federal Truck Company of Chicago was incorporated with a capital of $10,000, dealing in automobiles, trucks, vehicles, etc. Incorporators, Carey W. Rhodes, David F. Rosenthal and Leo S. Rosenthal.

Julian Motor Company of Syracuse, manufacturing and dealing in motors, engines, motor vehicles, etc., was incorporated with a capital of $200,000. Incorporators, Julian S. Brown, George A. Young, Ernest W. Lawton.

Hewitt Motor Company of Manhattan, manufacturing and dealing in automobiles, etc., was incorporated with a capital of $1,000,000. Incorporators: Alden Ames, Robert E. Henley, John O. Wingrace; all of 30 Pine street, New York City.

The Swanson Motor Car Company of Chicago, was incorporated with a capital of $50,000 to handle automobiles, motor cars, trucks, etc. Incorporators: Charles E. Swanson, Elmer E. Challenger, Marshall E. Gallion.

The Toledo Auto Delivery Service Company of Toledo, O., has been incorporated with a capital stock of $10,000 to do a general business of transporting passengers and freight by means of automobiles and motor trucks. The incorporators are Charles K. Friedman, Joseph Strauss, Kittie Alexander, Joseph Alexander and Morris Tobias.

Curtiss Motor Company, New York, N. Y., with Glenn G. Curtiss, the aviator and aeroplane manufacturer as president, has been incorporated for the purpose of taking over all of Mr. Curtiss' enterprises, including the manufacture of aeroplanes. The new company controls the Curtiss Aeroplane Company, which

NEW FACTORY FOR THE FEDERAL MOTOR TRUCK COMPANY, DETROIT, FORMERLY VAN DYKE PLANT

NEW FIREPROOF WHITE GARAGE IN PITTSBURGH, SHOWING CORNER LOCATION AND ORNAMENTAL EXTERIOR

manufactures the Curtiss biplane, and the Curtiss Exhibition Company, which manages a number of the most prominent aviators and which is the selling agency and foreign representative for the Curtiss Aeroplane Company. Arrangements have been made for the sale of 500 shares of seven per cent. cumulative preferred stock. The proceeds from the sale of this stock are to be utilized for improvements to the present factory at Hammondsport, N. Y., which will be enlarged to handle the increased business of the Curtiss Aeroplane Company. The directors of the Curtiss Motor Company are Glenn H. Curtiss, Monroe Wheeler, president of the Curtiss Exhibition Company; Jerome Fanciulli, vice-president and general manager of the Curtiss Exhibition Company; G. Ray Hall, secretary of the Curtiss Aeroplane Company, and Philip B. Sawyer, Elmira, N. Y., who will represent the purchasers of the preferred stock.

New Trade Printed Matter

Hyatt Roller Bearing Company is sending out the season's greetings with a quotation from Henry Ward Beecher, on a small booklet.

The Anderson Electric Car Company of Detroit has published a very handsome catalogue showing different styles of commercial vehicles. The type, press and art work are unusually fine.

The Merchant & Evans Company of Philadelphia has a new catalogue describing change speed gears, motor suspensions, star tire cases, imported axles, springs and parts, chassis and special steels.

The selling branch of the De Dion Bouton Company of Puteaux, France, in the United States is at 1649 Broadway, New York, in charge of Emanuel Lascaris. Mr. Lascaris is sending out a new catalogue in which commercial vehicles are prominent.

The Pierce-Arrow Motor Truck Company, Buffalo, has a very beautiful new catalogue showing the 1912 models, with interesting views of various trucks at work.

Factory Enlargements and Additions

The White garage in Pittsburgh is shown in the sketch on this page, this being a branch of the Cleveland factory of the White Company. It will contain 42,000 square feet of floor space and will accommodate 300 cars. The building will be fireproof throughout, with a highly ornamental exterior and showroom, the latter being done in white and gold with a white tile floor. It is said this will be the finest in the Smoky City, ready for occupancy April first.

The Eisemann Magneto Company has transferred its main offices to 225-227 West 57th street, New York City. The same were formerly located in the Ford building, Detroit. H. D. Wilson will have charge.

NEW BOND BUILDING IN KANSAS CITY

The Henry & Wright Mfg. Company, Hartford, Conn., has purchased the plant of the Parker Motor Company in that city.

The Atwater Kent Mfg. Company of Philadelphia has purchased a two-acre tract of land on which they intend building a factory and laboratory.

The Weston-Mott Company, Flint, Mich., has established offices for the convenience of automobile manufacturers in the Detroit and Chicago territory.

The General Motor Truck Company is making plans for the erection of a large distributing plant on the Merriam property in Chestnut street, Springfield, Mass.

The Firestone Tire & Rubber Company has opened a direct factory branch in Dallas. It will be located at 1521 Commerce street and be under the management of P. B. Talbott, for many years a traveling salesman for that company.

The Kelly Motor Truck Company of Springfield, O., awarded the contract for a new 50 by 120 foot warehouse to Clift Wise. The new building will be constructed of steel and reinforced concrete, and will be located north of the present buildings of the company.

The Bond Motor Company, Kansas City, Mo., is one of the hustling organizations of the Middle West which has taken on a motor truck agency. This firm handles Everitt cars and trucks, Franklin touring and commercial vehicles and Hewitt trucks. The business has grown so rapidly as to require a bigger building, and that shown on this page is now being erected.

The Hexter Motor Truck Company, metropolitan agents for the Gramm and in reality a branch of the factory at Lima, Ohio, are to occupy on January first what is probably the largest exclusive motor truck service building in the city. This is located at 427-431 W. 42nd street, New York City.

The Hyatt Roller Bearing Company, Newark, N. J., has increased to such an extent in and about the state of Michigan that the offices there have been moved to new and larger quarters. The new location includes the use of the entire second floor of the building recently erected at the corner of Woodward and Alexandrine avenues, Detroit, and shown in the accompanying photograph. B. C. Koether, sales manager, will be in charge and will have at his disposal a complete engineering and technical department.

Plans have just been completed for a new building 250 by 60 ft. for the Lauth-Juergens Motor Car Company, which is to be used for assembling and body building departments of its factory. The large increase in the demand for Lauth-Juergens trucks has made it necessary to triple the capacity within the last six months. Another large building will be erected in the spring, and it is hoped with this addition of two new large buildings, together with the three buildings now occupied, will be sufficient to turn out all trucks contracted for and to be taken within the next twelve months.

The Chase Motor Truck Company, Syracuse, has just completed a large three-story addition to its factory, adding 18,000 square feet. The marked increase in the company's business in the past few months has made this imperative, including a further possible rearrangement of offices which will yield more space. This firm intends to be represented at most of the leading automobile shows, including New York, Chicago, Philadelphia, Pittsburgh, Cleveland, St. Louis, Boston, Syracuse, Milwaukee and probably Toronto. During the last two months a network of agencies has been spread across the country, and new ones include Milwaukee and Kenosha, Wis.; Minneapolis, St. Louis, Omaha, Neb.; Newark and New Brunswick, N. J.; Baltimore, Charlotte, N. C.; Buffalo, Wheeling, W. Va.; Plymouth, Mass.; Springfield, Ill., and Springfield, Mo.

Brief Personal Mention

A. T. Le Blanc has been appointed sales manager of the New York offices of the Eisemann Magneto Company.

General Manager Janney of the Randolph Motor Truck Company of Flint, has been chosen to succeed General Manager Hardy at the Marquette plant.

H. A. Bayley is manager of the Detroit branch of the Weston-Mott Company located at 870 Woodward avenue, telephone Grand 77.

Harry G. Stoddard has become associated with the Wyman & Gordon Company of Worcester, Mass., in the capacity of vice-president and general sales manager.

J. A. Vaughn has succeeded H. W. Farr as manager of the Cadillac Motor Sales Company, Cincinnati, O. Mr. Farr has returned to his former home at Detroit.

Myron Townsend has been engaged as assistant advertising manager of the Timken Roller Bearing Co. and the Timken-Detroit Axle Co. He is widely known as a newspaper writer.

L. B. Garrison has resigned his position with the Peerless Motor Car Company, Chicago, and is now with the Speedwell Motor Car Company of that city, where he has charge of the motor truck division.

William Duffy, formerly with the Motor Supply Company at Eighth and Race streets, Cincinnati, has associated himself with the Fisk Rubber Tire Company, with offices at 816 Main street.

C. J. HOLDREDGE, SECRETARY COMMERCIAL CAR SALES CO.

R. S. de Mitkiewicz has resigned as sales engineer with the Motor Engineering & Sales Company of New York City. He has accepted a position in the truck department of the Peerless Motor Car Company of the same city placing Peerless trucks in the East.

Charles E. Reynolds, of Syracuse, N. Y., one of the best known old time bicycle salesmen, has recently been made a district manager for the Chase Motor Truck Company, of that city. His territory covers Chicago and certain portions of the Middle West. He has established headquarters in the Marquette Building, Chicago.

Albert H. Doolittle, advertising and publicity manager of the Knox Automobile Company, has resigned his position to take effect the first of the year. Mr.

REPEAT ORDER FOR COMMER TRUCKS WITH STEEL DUMPING BODIES FOR H. L. HERBERT & CO., NEW YORK CITY

K. B. HARWOOD, PRESIDENT COMMERCIAL CAR SALES CO.

Doolittle is well known to the trade through his long practical automobile experience which has taken him through every step of motor car manufacture, distribution and advertising, so that his new venture as a specialist in this class of publicity will be followed with interest.

K. B. Harwood has severed his connection with the Autocar Company, with which he had charge formerly of the New York City sales. He has formed the Commercial Car Sales & Service Company, in Chicago, of which he is president, and C. J. Holdredge, secretary and treasurer. This concern will have the exclusive sales of Autocar commercial vehicles for that city and a large surrounding territory. After operating for less than 30 days, such large sales resulted that a carload of additional vehicles was ordered. A large showroom has been secured at 918 Michigan avenue, with a garage, maintenance and repair departments in the rear. The latter will accommodate 50 trucks.

Miscellaneous Notes of the Trade

Atlas Chain Company, Bush Terminal, Brooklyn, had its commercial car grip, for use on solid tires, ready for delivery by January 15th.

The Katz Mattress Company of Chicago has placed an order with the Lauth-Juergens Motor Car Company of Fremont, Ohio, for two two-ton trucks. This is the third order received by the Lauth-Juergens people for this concern.

According to a census report issued in November there were manufactured in 1909 127,289 motor vehicles, of which 122,505 were pleasure vehicles, 1428 were public conveyances, 68 for government and municipal purposes, and 3288 were business vehicles or motor trucks.

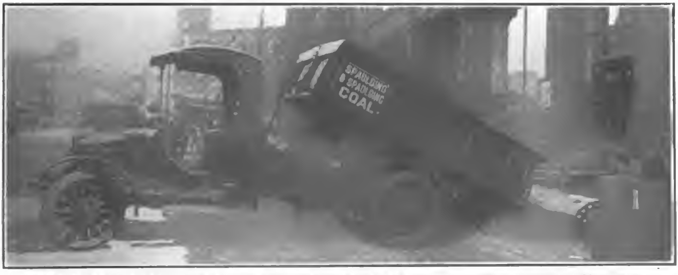
The Police Commissioners of Wilmington have decided to substitute automobile patrol wagons for those now drawn by horses, and the contract for the first motor vehicle for the department has been let to the Pierce-Arrow Motor Co., of Buffalo, N. Y. It is to have a capacity for carrying 12 men and is to be delivered as soon as it can be built, which it is expected will be within the next two months.

The General Motors Company's annual report for the 10 months ending July 31, 1911, showed a net profit of $4,447,146.58. Deducting from this the various fixed charges there was left for the undivided profit account the sum of $2,474,176.98. Of this $2,000,000 was applied to a reduction of inventories and smaller items for other purposes, leaving a net profit and loss surplus on the date mentioned of $1,240,175.26. It will be remembered that this company includes the Randolph, Rapid and Reliance commercial vehicle concerns.

The Chase Motor Truck Company, of Syracuse, N. Y., was very much gratified last week to get an order from the Cleveland branch of the Singer Sewing Machine Company. This great corporation is one of the largest users of horses in the world and only recently began to consider supplanting these thousands of animals with motor trucks. The Cleveland branch has selected a model "D" truck of 1500 pounds capacity. The body will follow somewhat the general lines of the regular sewing machine wagon. The seats will be fairly high, but the sides will be extremely low, barely six inches above the floor of the truck.

Great increase in motorcycles is shown in the preliminary report issued by the Department of Commerce and Labor, based on the recent census compilation of figures. Since bicycles, motorcycles and parts makers are grouped it is impossible to give exact statements. In this class, however, from 1904 to 1909, the number of manufacturers was 101 to 95, while the capital invested went from $2,628,000 to $5,083,000. In the same period the value of the products increased from $5,153,000 to $10,699,000, a change of 108 per cent. The total number of employees was 3,680 in 1904 and 4,939 in 1909.

The Federal motor truck, which won a cup in the recent Chicago-Detroit reliability contest, after demonstrating in Chicago for a couple of months, was a participant in the recent Glidden tour and went through the entire run carrying considerably more than a ton of baggage. The truck is still running on the same Goodyear tires on which it was tested before it left the Detroit factory. The service to which this truck has been put has been uniformly as hard as possible, practically all country roads, and the truck has in



PIERCE-ARROW FIVE-TON DUMPING TRUCK IN SERVICE OF BUFFALO COAL FIRM, SHOWING MECHANISM

NEW HOME OF HYATT ROLLER BEARINGS IN DETROIT, SECOND FLOOR BEING OCCUPIED EXCLUSIVELY

both reliability contest and Glidden tour carried an overload of about 30 per cent. more than its rated capacity.

The American Ball Bearing Company, Cleveland, is preparing to place on the market axles equipped with Lanchester worm gear for truck purposes. This new type of gear was one of the real features at the New York Show.

A decision handed down by the United States Circuit Court of Appeals recently marks the end of long litigation which the Weed Chain Tire Grip Company, of New York, has conducted throughout the country against manufacturers of various devices claimed by the Weed company to be infringements of its patent.

The following concerns have recently been elected to membership in the Automobile Trade Credit Association: Adams & Westlake Company, Chicago; Gallagher & Tompkins Company, New York City; Frank W. Morse Company, Boston; The Reflex Ignition Company, Cleveland, and Shawmut Tire Company, Boston.

Eight Commer trucks are now owned by H. L. Herbert & Company, New York City, the well known coal firm, a recent addition of three to the fleet being shown in the accompanying illustration. This firm's early experiments were unsatisfactory, but last winter a trial of a Commer resulted in the hauling of 772 tons of coal in 13 days at a cost of less than six cents a ton-mile. This induced the first order for a single vehicle. The others have been added since then at short intervals as the horses died or needed replacement.

The Board of Police Commissioners has taken official cognizance of the necessity for regulating street traffic in Wilmington, Del., and at a meeting on Saturday decided to take such steps to control the situation as are deemed advisable and possible with the men available for the purpose. The trouble has existed for some time, but it has become more apparent recently, since a municipal ambulance and automobile have been in operation. The drivers are greatly annoyed by teamsters who do not give them the right of way and complaint has been made to the police commissioner.

The Federal motor truck which won a cup in the recent Chicago-Detroit reliability contest, after demonstrating in Chicago for a couple of months, was a participant in the recent Glidden tour, went through the entire run carrying considerably more than a ton of baggage. The truck is still running on the same Goodyear tires on which it was tested before it left the Detroit factory. The service to which this truck has been put has been uniformly hard as possible, practically all country roads, and the truck has in both reliability contest and Glidden tour carried an overload of about 30 per cent. more than its rated capacity.

The American Locomotive Company is receiving many repeat orders for the Alco truck. Some of the more recent ones are as follows: Kohler & Campbell, the New York piano manufacturers, installed the first Alco truck a year ago. Henry Kroger & Co., wholesale liquor dealers of New York City, bought an Alco truck 1.5 years ago and has just entered an order for another. Three Alcos have been ordered by Morris & Co., the Chicago packers. The Morris company is now operating five Alco trucks. The first vehicles were purchased by this company six months ago. The New England Coal & Coke Company of Boston is supplementing its motor vehicle equipment by two more Alcos, having had one in operation for a year.

The New Departure Manufacturing Company, Bristol, Conn., has installed at its Western branch, 1016 Ford building, Detroit, Mich., a measuring machine which is available to the trade in general for close measuring. This service is offered without cost. The machine positively indicates variations of 1/40 of .001 inch, and is a duplicate of the machine used by the company at its factory in Bristol, Conn., in manufacturing accurate gauges used for inspecting New Departure ball bearings. This machine is so delicate that it is affected by temperature. In setting the machine a microscope is used in which are hair lines which correspond to similar lines on a graduated bar.

THREE-TON PEERLESS TRUCK IN SERVICE OF STANDARD OIL COMPANY, MEMPHIS, TENN., SHOWN AS IT APPEARED IN RECENT PARADE

BOSTON will open its first annual commercial vehicle show on March 13th, when New England, or that portion of it which did not go down to New York and vicinity for the national shows of the early winter and local displays of more recent dates, will see for the first time all of the country's best in motor-propelled business wagons segregated by themselves. This is the Hub's first attempt to divide the two forms of cars; in previous years the display known throughout the country as the dealer's show has had a mixed lot of cars, pleasure, commercial and some motorcycles side by side.

With the first attempt at two separate shows will come the test of whether this is worth while or not. The management of the display has answered this already in the affirmative, its source of information being the demand for space on the part of dealers in the city and outside firms not yet represented there. To date these total 61, of which number 45 have been seen previously at Chicago, 25 at the Garden, 18 at the Palace, while 10 will appear at Boston for the first time this year in a big show.

It is a notable fact that of the 18 Palace firms, two have not since then appeared elsewhere, namely Lippard-Stewart and Universal, while of the Chicago group, five have not appeared elsewhere nor were they at either New York display. These are International, Kissel, Philadelphia, Mercury and Sandusky. This is remarkable, too, because only two of them are from the Windy City, although four are classed as Western.

Of the ones appearing for the first time, one, De Dion Bouton, was at the Importer's Salon, but not with a commercial chassis, as will be the case at Boston; another, Mais, utilized a store across Madison avenue from the Garden during the course of the show there, while a third, Teel-Woodworth, has appeared at the Providence local display but not anywhere else. In the list also will be noted two well known pleasure car makers, whose exhibits will be scanned very eagerly, namely, Chalmers and Ford. The latter has often talked of going into commercial work on a large scale but never has done so, while the former is known to have been working on a truck chassis, aside from its public service vehicles such as patrols and ambulances, for some time.

The firms to be seen at Boston and not previously at a big show this year are: Cameron, Chalmers, Clark (Boston), Couple-Gear, De Dion Bouton, Ford, Mais, P H P, Stanley (steamer) and Teel-Woodworth. Last year at this exhibition, the Clark and Harrison trucks were the two notable newcomers, but the latter seems not to have booked space this year.

An Unusual View of the Boston Halls, Taken From the Upper End and Showing Huntington and Revere Halls, with the Better-Known Mechanics Hall Beyond

The appearance of the lone steamer is worthy of note or will be, if this firm exhibits a commercial vehicle instead of the pleasure car, for which it is well known, because in the early days New England was very much inclined toward this form of power. A number of steam lorries were imported from England and several agents took on such vehicles. Impelled forward by the success of these, several firms started to build huge trucks impelled by steam power. Among these may be cited the case of Ralph L. Morgan, better known as the designer and head of the concern bearing his name, although it is understood he has left the latter recently. In Boston in the early days he had a shop and built quite a few of these heavy vehicles, all of which did very well.

A field in which something out of the ordinary may be expected at this show is the matter of municipal apparatus and in particular, fire equipment. New England has made more progress in this line than any other section of the country, unless it be the case of Greater New York. In the latter, however, all of the expenditures have been made by two or three municipalities, whereas in the section formerly mentioned every small town has one, all good-sized cities have a few, while the larger places have a much larger number. Springfield, for instance, is notable in having been the first city to give up an entire engine house to motors, the first to build a fire house exclusively for motor apparatus, the first to con-

List of Exhibitors. Boston Commercial Motor Vehicle Show, March 13-20, 1912

Firm Name.	Car Name.
Autocar Company	Autocar.
Atterbury Motor Truck Co.	Atterbury.
Anderson Electric Vehicle Co.	Detroit Elec.
American Locomotive Co.	Alco.
Buick Motor Co.	Buick.
Butler Motor Truck Co.	G. M. C.
Boston Motor Wagon Co.	Motor Wagon.
Clark, Edward S.	Clark.
Curtis-Hawkins Co., The	Speedwell.
Chase Motor Truck Co.	Chase.
Cameron Car Company	Cameron.
Commerce Motor Car Co	Commerce.
Decatur Motor Car Co.	Decatur.
Dodge Motor Vehicle Co.	Waverley Elec.
Dayton Auto Truck Co.	Dayton.
De Dion Bouton	DeDion Bouton.
Eckhard Motor Truck Co.	
Eastern Motor Truck Co.	
Eldridge, W. E.	Couple-Gear.
Fuller, Alvan T.	Packard.
Ford Motor Co.	Ford.
Federal Motor Truck Co.	Federal.
Grabowsky Power Wagon Co.	Grabowsky.
Garford Co., The	Garford.
General Vehicle Co.	Gen. Vehicle Elec.
Gramm Motor Truck Co.	Gramm.
International Harvester Co. of America	International.
Kelly Motor Truck Co.	Kelly.
Kissel Kar Co., N. E. Branch	Kissel.
Locomobile Co. of America	Locomobile.
Lozier Motor Co.	Lozier.
Linscott Motor Co.	Reo.
Lansden Co., The	Lansden Elec.
Lauth-Juergens Motor Car Co.	Lauth-Juergens.
Lippard-Stewart Motor Car Co.	Lippard-Stewart.
Mais Motor Truck Co	Mais.
McIntyre & Co., W. H.	McIntyre.
MacAlman, J. H.	Stearns.
Mercury Mfg. Co.	Mercury.
Morgan Motor Truck Co.	Morgan.
Mack Motor Truck Co.	Mack.
Philadelphia Truck Co., The	Commercial.
Peerless Motor Car Co. of N. E.	Peerless.
P. H. P. Motor Truck Co., The	P. H.P.
Poss Motor Co.	Poss.
Phelps, Frank N.	Baker Elec.
Pierce-Arrow Motor Car Co.	Pierce-Arrow.
Sanford Herbert Co., The	Sanford.
Standard Motor Truck Co.	
Schlotterback Mfg. Co., L. E.	Newark.
Stanley Motor Carriage Co	Stanley Steamer.
Sandusky Auto Parts & Motor Truck Co	Sandusky.
Teel Mfg. Co.	Teel-Woolworth.
Underhill Co., The	Knox.
Universal Motor Truck Co.	Universal.
United Motor Boston Co.	Sampson.
Velie Motor Vehicle Co.	Velie.
Victor Motor Car Co.	Victor.
Walker Vehicle Co.	Walker Elec.
White Co., The	White.
Whitten-Gilmore Co., The	Chalmers.

Back View of Mechanics Hall, Giving a Good Idea of Its Size and Showing Where the Vehicles Will be Brought In. The Railroad is at the Right

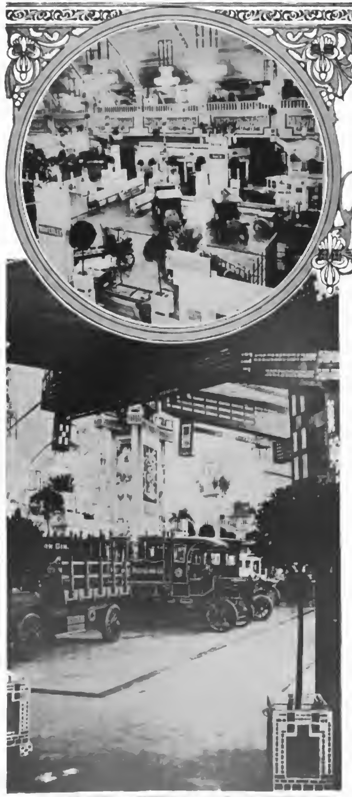
struct a fire headquarters solely for this type and has made the greatest progress with electrically-driven forms.

Boston having the reputation of being a dealer's show, this year will be no exception. From all New England they come to the display, make up their minds to what vehicle they want to handle or how many more they will order than last year and sign up. A recent trip around the electrical commercial agents in the city and Cambridge, across the river, showed that they are looking forward eagerly to this time, and almost without exception predict a large amount of business at that time, both as regards allotments to sub-agents and sales to users.

The same thing is true of the gasoline men; they are looking forward to this late show as a means of opening up the spring campaign. This is, as a matter of fact, one reason for holding the thing so late; earlier it would be too close to the other big displays and would lose by comparison; later it would be too late. But just in the middle of March allows the merchants and agents to think over what was new and different at the national shows and make up their minds, the former to buy vehicles and the latter to take agencies. As a result much business always has been done, and, as previously stated, this year is expected to be the same, except for degree, in that more is expected from the holding of a separate commercial week.

Nearer View of the Inclined Runaway by Means of Which Practically All Cars Will be Put Into and Taken Out of the Three Halls During the Week of March 13th

Chicago Show A Business Getter



One of the Side Aisles at Chicago Insert, General View from the Gallery

Eighty-Two Makers in Big Western Display Attract Large Attendance and Many Orders Are Placed—Worm Gears, Friction Drives and Special Dumping and Fire Bodies, the Notable Features—Exhibitors Well Satisfied—Many Dealers Present

NOTHING could have shown the big advantage which Chicago possesses in a show way better than the amount of business which was done at the recent display in the Windy City. This filled to overflowing all available space in the Coliseum, Annex and First Regiment armory, the three big buildings which are available for this purpose. Beginning with the opening day, when engineers from manufacturing concerns all over the country flocked in with rule and notebook in hand, making notes and taking down data for guidance in future purchases for their firms, until the close on Saturday night, the exhibitors were kept busy explaining their wares and incidentally taking orders.

Although the time has passed when any manufacturer of commercial cars goes into a show expecting to take enough orders during the week to pay for his outlay, such was the amount and character of the business done in Chicago that many expressed themselves as better off even than that.

From the management of the show, the National Association of Automobile Manufacturers, with S. A. Miles in active charge, comes the statement that while the pleasure car week outdid last year in attendance by 20 per cent., the number during the second six days was in excess of 1911 by just 40 per cent. This would appear to show that interest in the commercial vehicle is increasing more than twice as fast as in touring and other pleasure cars.

Speaking of actual sales recorded, it is said that one firm took an order from a single concern for $40,000 worth of trucks, while a tire firm reported an order totalling an equal amount. The Baker company was reported to have received an additional large order from the American Express Company for vehicles to be used in the West, and the White Company took one order for 10 of the new five-ton trucks for a Southern ice concern. The International Motor Company received many Western orders, while Packard and Knox did a large business. Other makers were equally fortunate.

In the character of dealers present a change was noted in that the majority presented a more serious and businesslike appearance than was the case in previous years. This means that the sale of commercial vehicles has become more of a business and less of a game. Service facilities were made more prominent both on the part of the dealer and in the maker's demands.

Many cars were present for the first time at a big show, the following being seen, all of which were not at New York shows: Bessemer, Blair, Commercial, Dain, Diamond T, Dorris, Indiana, L A W, Old Reliable, Mogul, M & P electric, Natco, Sandusky, Schmidt, Service, Smith, Staver, Stegeman, Sternberg, United States, Whitesides and Wilcox. In addition, a number were at Chicago for the first time, although previously seen at New York. These included: Best, Commerce, Dart, G. M. C. electrics, Locomobile, Lozier, Motor Wagon, Packers, Poss and Speedwell.

Prominent among the mechanical features were the worm drive and friction transmissions. The latter were mostly on small, light cars, but the worm seemed to be in all sizes. The following gives the cars not seen at either New York show:

View of the Main Aisles in the Coliseum, Packard, Locomobile, Mack, Saurer in the Foreground, and Beyond, Garford, Walker, Knox, Reo, Kelly and Pope-Hartford

Adams, Adams Brothers Company, Findlay, O.—This firm showed four one-ton chassis with three differing bodies. The body forms are low-stake platform, flare-board, light express and bus with longitudinal seats. The chassis is marked by a sloping type of hood with the radiator on the dash and driver back of that. Left-hand control with right-hand levers is a feature.

Avery, Avery Company, Peoria, Ill.—Exhibited three of its vehicles, these being a two-ton city truck with flare-board body, same with top and high stakes, three-ton farm truck with low-panel sides. The wheels are a feature of this car, which is designed primarily for farmer's use. These are of various kinds, according as the vehicle must be utilized on soft ground, over marshy or swampy land, or on a hard, packed highway.

Bessemer, Bessemer Motor Truck Company, Grove City, Pa.—A single one-ton chassis with flare-board body constituted this firm's exhibit. This is marked by a block motor with dual ignition. The radiator is set on pivots, which allow it to yield when the frame twists or is distorted. In addition a cross-member in front protects the delicate cooler.

Blair, Blair Manufacturing Company, Newark, O.—This was one of the features of the show, since this product has a final drive by means of worm and gear. Although built in three sizes, but the 2.5-ton model was on exhibition. Other features are the driver's location alongside of the motor housing, the use of a fixed spark and governor for controlling the speed, and provision for removing the units individually.

Clark, Clark Delivery Car Company, Grand Crossing, Ill.—This maker concentrates on a single one-ton chassis. This was shown with three different body types, a low-stake platform, screen delivery wagon and low-stake platform with several forms and sizes of stakes. The engine is featured by valve enclosure, block casting of cylinders, suspension on a sub-frame and automatic advance spark ignition.

Commercial, Commercial Motor Truck Company, Philadelphia.—An Eastern newcomer, showing a single vehicle, a 1,500-pound delivery wagon with paneled body. This is remarkable in that it has an electric starter, while electricity is used to light the

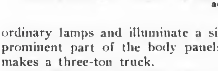
A Portion of the Main Aisle in the Coliseum Showing Mack, Saurer, Locomobile, Packard and Others

ordinary lamps and illuminate a sign which forms a prominent part of the body panels. This firm also makes a three-ton truck.

Dain, Joseph Dain, Ottumwa, Ia.—A single chassis was exhibited, this being operated continuously by means of an electric motor for the purpose of bringing out the transmission features. The speed-changing device is a notable one, consisting of a combination of friction discs by means of which the high is a direct drive with all discs out of engagement, but on the other speeds they furnish the reduction. Final drive is by means of a worm and gear.

Diamond T, Diamond T Motor Car Company, Chicago.—A five-ton chassis and same with high-stake platform body for a plumbing house constituted this exhibit. The construction follows standard practice, excellent materials and workmanship being notable throughout. The driver is placed on the right side, with levers at that side also.

Dorris, Dorris Motor Car Company, St. Louis.—A 1500-pound delivery with slat body and standing top, and a two-ton chassis marked the advent of this pleasure car maker into the commercial field. The latter has a four-cylinder motor in front with cylinders in pairs. A self-starter is fitted, of the compressed gas form, this being one of the few in the show with starters.



Relative Number of Exhibitors in Chicago Commercial Shows

Harder, Harder Auto Truck Company, Chicago.—This local maker had an excellent corner in the Annex, this being filled with three vehicles. These were: Combination chemical with two 40-gallon tanks on a two-ton chassis, high-stake platform on the same frame and express body with top on a three-ton chassis. For safety's sake the radiator is hung on springs from the frame.

Indiana, Harwood-Barley Manufacturing Company, Marion, Ind.—Although built in several sizes, the maker of this vehicle displayed but one, a 1.5-ton truck. This has a Rutenber four-cylinder engine set on a sub-frame at the front. Control is right hand with left-hand levers. A fixed spark helps to simplify the control, while a foot accelerator gives the driver excellent control over the movements of the car.

International, International Harvester Company, Chicago.—This car, often called I H C, was seen in three body forms, the chassis being identical. These were: High-wheeled buggy, panel delivery and open-side delivery with flare-boards and top. It is marked by an opposed air-cooled two-cylinder motor, placed beneath the floor boards, a fan being used for each cylinder to direct air upon the cooling flanges.

Jeffery, T. B. Jeffery Company, Kenosha, Wis.—This 3000-pound vehicle, the product of a well-known pleasure-car maker, is so heavily constructed that it is understood its maker proposes to rate it at two tons capacity, the load for which it was designed. It attracted much attention, being one of the newcomers. The driver is placed over the motor on the left, with right-hand levers, the latter being placed between the two parts of the divided front seat. The radiator is spring supported and protected by a front cross member. A governor is fitted to control the motor speeds.

Kissel, Kissel Motor Car Company, Hartford, Wis.—In the past year this well-known pleasure-car firm has decided to go into the commercial end deeply, hence its Chicago exhibit was one of the most complete. It included 1500- and 2000-pound delivery wagons, two-ton chassis with flare-board body and top, also combination chemical and hose wagon, three-ton furniture truck for Revell, a Chicago house, and five-ton chassis. All models have the driver back of the engine and on the right-hand side with right-hand levers.

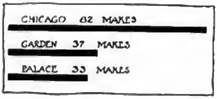
L A W, L. A. W. Motor Truck Company, Findlay, O.—A block motor on a sub-frame, with enclosed valves, marks this product, a 1.5-ton vehicle. The driver is on the left with center levers placed directly upon the transmission cover. The spark lever is omitted and an automatic advance on the magneto substituted. Final drive is by shaft with a double reduction at the rear axle.

Little Giant, Chicago Pneumatic Tool Company, Chicago.—This one-ton truck has a two-cylinder opposed, air-cooled engine and planetary transmission. The latter has a most ingenious control method by means of which a single lever operating selectively gives the three speeds. Four body types were shown, also a motor and transmission mounted on a stand. The former were: Screen delivery, open rack type for bottling company, low stake platform and chassis.

Mercury, Mercury Manufacturing Company, Chicago.—This delivery wagon is of 1000 pounds capacity and three bodies were shown. These were flare-board, screen-sided with canvas covers and enclosed panel form for a tea company. The last-named was notable in that the driver was wholly enclosed, but had access to the entire load within. In addition, he had a pair of sliding doors, one on either side, so that he could get out at the right or left, whichever was most convenient.

Mogul, Mogul Motor Truck Company, Chicago.—This local firm has entered the industry recently with a line of medium and large-sized vehicles. Three are built regularly, of two, four and six tons, the first and last being shown in the Armory. These have a number of distinctive features, as for instance, the radius rod adjusts entirely from the front end, no threads or other adjusting means being placed in the back part to weaken it. Frames are in a single piece. The cab framework is of metal and a permanent part of the chassis, despite which it can be removed in a very short time. There are no rivet or other holes in the bottom flange of the main frame.

Monitor, Monitor Automobile Works, Janesville, Wis.—This exhibit consisted of a 1500-pound flare-board, a one-ton chassis and the same with low-stake platform body arranged for very long bars. To this end the driver is located on the right with an individual seat, the radiator is no wider than that part of the car, thus leaving a passage on the left side about two feet wide for long material to extend over the front end of the framework. This chassis was equipped with the new Perfex radiator, which cannot freeze up, it is claimed.



How the Chicago Display Compared in Numbers with New York

M & P, M & P Electric Vehicle Company, Detroit.—This newcomer displayed a single vehicle, 1000-pound delivery with low flare-board express body. It has the lead batteries underslung amidships, while the driver is placed on the left with a tiller, the controller lever being on the left side as well. There is but one pedal for the brakes in the hubs.

Natco, National Motor Truck Company, Bay City, Mich.—This exhibit marked the advent of an old-established parts manufacturing firm into the motor wagon industry. The single vehicle shown was of one-ton capacity, although larger sizes are promised later on. This car has the driver above the engine, but placed in such a way that the height is not excessive. He is on the left side as well, with right-hand levers. The ignition is fixed. Other features are radiator on coiled leaf springs, heavy frame narrowed at the front for short turning, chain enclosure and micrometer adjustment of the latter for giving proper tension to the driving chains.

Old Reliable, Henry Lee Power Company, Chicago.—Another of Chicago's long list of local mak-

One of the Side Aisles with Pierce-Arrow in the Foreground and a Portion of the Waverley Exhibit ers, the product of which is large chassis, showed two forms of 3.5 to five tons capacity without body and the same with high-stake platform for handling barrels. One feature of these is the radiator support, this being by means of a flat leaf spring at the bottom with a pair of coiled members set horizontally at the top. At the bottom a cotter pin holds the pin supporting the spring, while the arrangement of the water connections is such that both are opened easily. This allows the driver to take the cooler off in a very few minutes.

Premier, Premier Motor Manufacturing Company, Indianapolis.—Right across the aisle from Jeffery was another newcomer, the Premier. This firm showed the prairie schooner which accompanied the cross-continent tourists last summer and a 3,000-pound delivery wagon. The latter had a standing top and flareboard sides. In general, the driver is back of the motor on the right side; in fact, the whole job follows pleasure-car lines very closely. A governor is to be added later, working from the driving shaft, not from the engine speed.

How the Cars Were Towed In by Means of the Walker Electrics Loaned by the Commonwealth Edison Company of Chicago

Sandusky, Sandusky Auto Parts & Motor Truck Co., Sandusky, O.—This firm drew much attention during the early days of the show because of a rumor to the effect that the Grabowsky company would sue it. This, which was later denied by both parties, serves to call attention to the principal feature, namely, the removable power plant. In this the motor clutch and transmission are in a unit, mounted with the radiator and all water pipes and connections on a subframe which is on rollers, and thus, can be withdrawn readily. A cam and lever arrangement serve to lock the whole in place or release it quickly.

Schmidt, Schmidt Bros. Co., Chicago.—This vehicle, which was shown in two sizes, 1000-1500 and 2000 pounds, has a two-cylinder opposed air-cooled engine placed beneath the center of the chassis on a dropped subframe, much like the battery slinging of an electric. This permits of locating the driver at the extreme front end, and thus, utilizing the largest portion of the chassis for body length.

Service, Service Motor Car Company, Wabash, Ind.—This product, of which two samples were shown, 1500 delivery and 2000 chassis, has a friction transmission of the four-disc type located at the jackshaft. The use of this gives the maker his slogan, the car without a gear. The motor is a four-cylinder block unit, located at the front, with a forward cross-shaft for the magneto and other accessories.

Smith, A. O. Smith Company, Milwaukee.—The new three-ton chassis was easily the feature of the Armory exhibits. Besides a worm drive, the vehicle showed such a large number of distinctive points as to attract much favorable attention at all times. The transmission gears, for instance, have their bearing in the upper half, which may be removed by means of an overhead crane by taking out a few bolts. Similarly, the works and gear may be taken out from above as a unit by removing a few holding bolts and withdrawing the floating axle shafts. The radiator is three-point supported and consisted of a series of 380 vertical, finless copper tubes. Transmission gears are of the herringbone type with unusually wide faces. Other features will be described in these pages at a later date.

Staver, Staver Carriage Company, Chicago.—A beautiful white ambulance on this firm's one-ton chassis was the sole occupant of the space. This is modern in every respect, the side seats folding up, while the upper cot swings on springs and the lower one has a wicker frame flexibly mounted on the floor. The doors are numerous, the double ones at the back being supplemented by one on either side forward.

Stegeman, Stegeman Motor Car Company, Milwaukee.—This firm displayed a well-balanced lot of cars in one-, two- and four-ton sizes. The two-ton chassis, which was given the foreground, has a unit power plant with a block motor. Simplification is noted in the use of one pedal for both clutch and shaft brake, and the elimination of the spark lever in favor of automatic advance. The spokes in the wheels are square, while all wheels have a central thrust bearing midway between the two radial forms. Ball bearings are used on all wheels. A governor is fitted to all models.

Stephenson, J. I. Case Threshing Machine Company, Racine, Wis.—Two trucks were shown. They were of one ton and three tons capacity. The former had a plain platform and the latter a low stake form. Both are equipped with a patented friction transmission, both this and the engine being set at a slight angle so as to give a straight line drive to the rear axle. The radiator is hung on a cross strap from the main frame. Large-sized wheels are used on both of the models.

Sternberg, Sternberg Manufacturing Company, Milwaukee.—Although made in a number of different sizes, faith in railroad transportation prevented more than one four-ton model being shown, the other being lost somewhere between Milwaukee and Chicago. The one shown was notable for clean design and ample sizes of parts. It has the overhead driver position with right-hand levers. The spark lever is omitted in favor of automatic advance. The transmission and jackshaft have one notable feature in that a cast-steel cross member joins the two sides of the frame below the countershaft, the unit being supported upon it in such a way as to be removed easily and quickly.

United States, United States Motor Truck Company, Cincinnati.—This concern displayed a 1.5 and a three-ton chassis, the former with a flare-board body. On these the transmission, giving three speeds forward, is of the individual clutch type with a selectively operating lever. The frame has a peculiar feature in that it consists of an angle set upon the top of a channel section.

Whitesides, Whitesides Commercial Car Company, Newcastle, Ind.—This firm had on exhibition a one-ton, low-stake platform truck. The 1500-pound delivery wagon was not shown. That displayed has a four-cylinder block motor located in front under a hood, the driver being back of it. The control is divided, the emergency lever being at the right and the planetary transmission operating lever on the left. Three pedals complete the control.

Wilcox, H. E. Wilcox Motor Car Company, Minneapolis.—Two cars were exhibited, a three-ton chassis and a 1.5-ton with a small cottage for a body. What attracts particular attention to this car is the cab which encloses the driver entirely, affording him entire protection from the weather and temperature changes. It is a notable fact that the utility of this construction is being recognized by other firms and is slowly being adopted by them.

Many of the Gasoline Cars Were Driven In Under Their Own Power by Using an Auxiliary Gasoline Tank and Rubber Hose

LIGHT CARRYING LEGISLATION SOUGHT

The Cleveland Automobile Club seeks to have a bill enacted at the next session of the high legislature which contains the two following pertinent paragraphs:

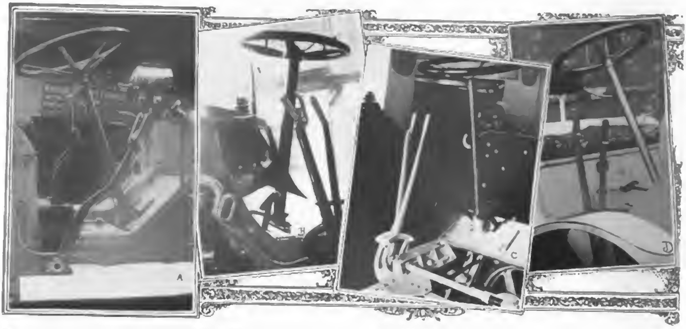
Section 1. That every vehicle which shall be used or driven upon the public roads or highways of this state, which said word vehicle shall include horse-drawn vehicles or vehicles drawn by other beasts, carriages and all other means of conveyance, except motor cars and motor cycles, and such as run upon rails and tracks, shall carry, during the period from one hour after sunset to one hour before sunrise, at least one lighted lamp or lantern, showing a light visible at least 200 feet. Said light shall be so displayed that it may be seen in the direction the vehicle is proceeding.

Section 2. Any person operating or driving a vehicle upon the public roads or highways in this state, in violation of Section 1 of this Act shall be deemed guilty of a misdemeanor which shall be punishable by fine not exceeding $25 for the first offense, by a fine not less than $10 and not exceeding $50 for the second offense, and by fine not less than $25 and not more than $100, or imprisonment for not more than 30 days for a third and subsequent offense.

Control Mechanisms and 1912 Tendencies

The General Design of Gear Shifting and Brake Levers, Spark and Throttle Control, Brake and Clutch Pedals, Governors and Automatic Spark Advance, as Well as Other Parts of the Control Mechanism

THE new models for 1912 give evidence of increased consideration of the driver's needs and conveniences over previous years, and greater appreciation of the fact that the truck's efficiency depends upon its operation. No finality in control design is as yet apparent, but there are strongly marked tendencies along certain lines indicating great strides toward a centralization on a few types. There is an increased number of minor refinements and conveniences that make for ease and efficiency in operation, and the position and design of levers and pedals as a whole are a great improvement over the past. The cab gives more evidence of having been designed with a purpose in view rather than having been put together simply because a truck must be provided with means of control, and with little thought as to the best way to produce effective results. As is true of every year there are notable departures from previous designs, some of which will have a marked effect on future practice.



Some 1912 Commercial Car Control Groups

A—Levers on the Knox fire pump for the town of Weehawken, N. J., which occupied a prominent part among the fire vehicles seen at the New York show. Here the lever which throws the pump into and out of engagement is not visible, being separated and placed near the pump

B—The control group on the Packard, showing the relative lengths of levere, position and size of pedals, and except for leather covered coil box, clean dash, which is now considered so desirable.

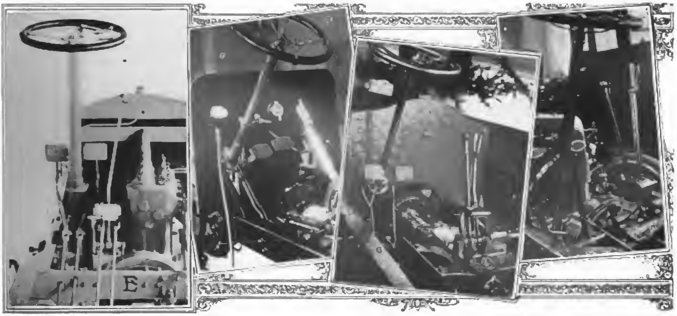
C—Left hand levers are noted on the Federal, both having simple outlines. The pedals are equally simple but each has a clip at the side to prevent the foot from slipping off, while the accelerator is of the piano or push-down type

D—Those parts of the mechanism which concern the driver mostly on the Clark light truck, taken over one fender but showing the levers, the brake pedal and accelerator as well as the clear steering wheel

The most noticeable tendency is toward the left-hand drive and center control, the former represented with the control levers located both at the left and in the center of the bed, and the latter on vehicles operated from both sides. In some cases the gear lever is placed in the center and the hand brake either at the right or left, according to the position of the steering column.

Although there is much to be said in its favor the advisability of the left-hand drive so far is largely a matter of opinion. It is claimed that it is much easier to observe the rules of the road and to avoid the possibility of collisions when operating from the left, the driver being on the side nearest to the vehicles he is passing. On the other hand, vehicles are usually brought up to the curb on the right side of the road, in doing which the driver on the right has the same advantage, with respect to being nearest the curb. The argument is sometimes made against the left-hand form that drivers, being accustomed through long usage to the right-hand method on both motor and horse-drawn vehicles, would have difficulty in making the change, but experience with both commercial vehicles and pleasure cars indicates that such a supposition is without foundation, as those who have made the change report no trouble.

The center control is unquestionably advantageous both from a mechanical point of view and from the standpoint of the driver. With the control levers in the center the driver may mount from either side with equal ease, and in almost every instance levers so placed are nearer to the driver's hand than those placed at either side of the bed. In the case of those centrally located on a vehicle having a right hand drive it sometimes is claimed that drivers cannot accustom themselves readily to operating the levers with the left hand. It is unreasonable to suppose that any great difficulty should be so encountered, or that the time required should be of any appreciable duration. Even though the balance should be in favor of operating the levers with the right hand it is counteracted by the fact that left hand operation leaves the right hand on the wheel at all times; and proper management of the steering wheel is of equal importance with operating the gears. Moving the levers involves no complicated movement, and by inquiries made of a large number of users not a single instance has been found wherein the center control was objectionable for that reason.



dditional Features of the 1912 Controls

E—Natco light truck from the rear, showing the levers placed at the left side and pivoted upon the crankcase foot on that side. This brings the driver down very low and simplifies all connections

F—Left side position for the driver marks the Newark worm driven vehicle also. Note the location of the levers on the gearcase cover and adjustable pedals which also have a notable equalizing means

G—Lippard-Stewart has the left hand control as well. Here, too, the levers are on the gearcase cover, but the pedal shaft is a unit which may be detached readily. This detachable idea is carried right through the design

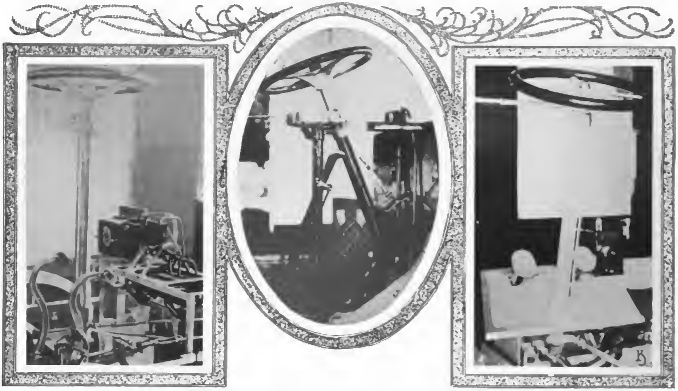
H—Right hand levers and left control on the Kelly chassis. The same pivotal location of the levers will be noted, while the very long pedals which give excellent leverage can be seen. The levers are inclined forward to give a free passageway

From a mechanical standpoint the advantage of the center control is that it eliminates parts. This is particularly true of trucks having the engine in front and the transmission under the footboard. The levers thus may be placed directly over the gearbox, reducing the necessary connections to a minimum. When the engine is under the seat, necessitating the placing of the transmission midway of the frame, the advantage is not so pronounced, as there must be connecting rods between the lever and the gears. The central position on this type will, however, reduce the length of the rods and do away with angles, making a straight line connection which will give more stability and will be less subject to derangement or mechanical faults.

The left hand drive combined with the center control has notable representation in the Adams, Dayton, G.M.C., Kelly, Lippard-Stewart, Mack, Motor Wagon, Modern, Natco, Newark, Pope-Hartford, Reo, Schacht, Bessemer, Jeffrey, LAW, Speedwell and US. The left hand control is on the Baker, M & P and Waverley electrics, Brush, Dain, Federal, Sandusky, Service and Velie. Good examples of the center control in combination with the right hand drive are the Avery, Blair, Garford, Indiana and Stephenson. The White Company also showed an example of this arrangement. The Stegeman illustrates the left hand drive with divided control, the gear lever being placed in the center and the hand brake to the left. The danger of this arrangement is that the latter may obstruct the passage to the seat. In the Stegeman, however, its danger is obviated by setting the lever far enough forward to afford ample room, the distance from its top to the seat being 14 inches.

The fixed spark has a greater number of adherents than has been the case heretofore. Its principle advantages are that it acts as a check against speeding and leaves one less control device that requires the driver's attention. The real advantage of the fixed spark depends, however largely upon the ability of the operator. A careful driver who is competent mechanically and is well acquainted with his vehicle undoubtedly can operate it to greater advantage if he can regulate his spark to suit conditions. A driver who has small mechanical knowledge and is inclined to speeding in the majority of cases will do better by his vehicle if the spark is fixed. An incident was recently observed that illustrated forcibly this point. A light delivery wagon in the service of a laundry was left at the curb while its driver, a boy of 18 or 19, made a number of deliveries in the block. Before leaving the car he throttled it down, the engine continuing to run during his absence. Its knocking could be heard from inside the house across the street, a distance of at least 125 feet, with the doors and windows closed, including heavy storm windows. This continued for a little over 15 minutes. During the driver's absence a friend crossed over to the car and found that the throttle was closed, but the spark was advanced half-way in a position suitable for running at a good rate of speed. No engine will stand up for long under such treatment, and it is safe to assume that, happening once, the same thing has and will occur many other times.

There is in some cases a noticeable tendency to equip light trucks with spark control and heavy models with set sparks and governors. There are good reasons why this order of things should be reversed. The tendency in transmission design is to make that of the light cars simple and as nearly foolproof as possible, and that of the heavy models more complicated and capable of a greater variety of operation, on the assumption that the operator of heavy trucks commands higher wages and is mechanically inclined, while the average driver of light vehicles is a delivery boy or a man who is paid small wages and has little or no mechanical knowledge. This being true, it would seem reasonable to follow the same course in regard to the control, equipping light cars with set sparks and heavy trucks with spark control from the seat. While speed is a greater factor in the design of light vehicles that will be required to make many stops in the course of a day's run, the driver can make all necessary speed by the use of his throttle and with far less wear and tear on his engine. This is emphasized by the fact that many of the pleasure vehicles, and notably the lighter cars, are so equipped and give entire satisfaction.



Some Speed Levers Beneath the Steering Wheel

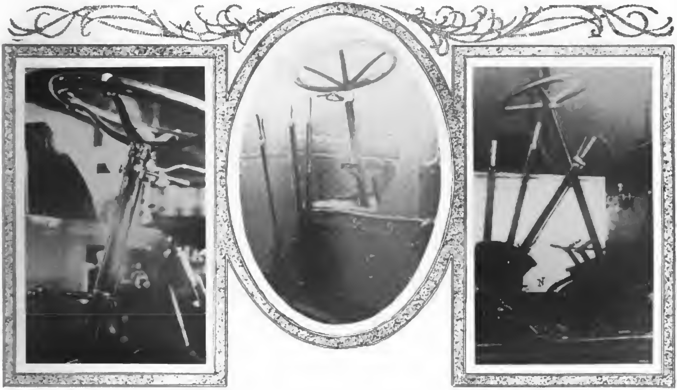
I—On the Argo electric delivery car, the speed controller lever is just beneath the wheel, instead of the more usual position in the side of the seat
J—The Commer truck has an unusual transmission with the operating lever below the wheel. This moves around a flat quadrant with notches for the three speeds forward and reverse. This is so built that it is impossible to engage two speeds at once
K—The long lever below the wheel is the gear shifting member on the Best light delivery car. This may be set in any position desired as the number of speeds is infinite, the transmission being friction

The heavy truck is subject in its operation to the character of the road, size of the load and atmospheric conditions, which will not affect the light cars materially. The driver of the heavy model can get more work out of his vehicle if he can regulate his spark from the seat. In negotiating inclines, pulling out of mud on bad roads, and in many other cases it is a great advantage to be able to speed up the motor as much as possible consistent with safety.

An automatic solution of the spark question appears on some models, a good example of which is found on the LAW. This consists of a device on the breaker box by means of which the spark is automatically advanced and retarded by the speed of the motor and the amount of gas admitted to the cylinders. The possible objection to this from the standpoint of operation is that while the spark is proportioned correctly to the gas in ordinary conditions, more power can be obtained for some needs when the spark is retarded and the throttle open, a condition that cannot be attained with an automatic advance.

The foot accelerator has representation on a large number of late models, appearing in many forms and in the majority of instances on the lighter vehicles. An original form is shown on the Gramm, consisting of a short lever attached to the bottom of the rod on the steering column which is controlled by the throttle lever. It is operated by the foot from left to right and has the advantage of simplicity, necessitating no additional connecting rods. It is also easy to operate, and may be held in any desired position with less effort than can the usual pedal type. Its possible fault is that it is a departure from the accustomed order, and might be hard for a driver used to the usual form to become accustomed to.

The Gramm also shows a distinctive style in the operation of the gear lever, which is placed at the right of the operator. This operates in a modification of the usual H slot, in the center piece of which holes are placed to receive a short pinion on the lever, one forward and one back of the neutral position. When the gears are meshed the pinion fits into the holes on either side, obviating the possibility of the lever being unintentionally knocked out of position.



Bracing the Control Post and Triple Shifting Levers

L—Steering post on the Schacht displaying the brace to the dish which stiffens this member, also showing the left side location with right hand levers

M—On the Gramm dumping truck three levers are needed, two for the vehicle, the other for the body. The last is the longest and is set slightly back of the others. It throws in the gear which raises the body

N—On the Stearns five-ton truck, a third smaller lever is utilized to throw the differential lock into play when the road becomes slippery or the lock is needed otherwise. The control is left handed and the group of levers is placed in the center

On the Kissel the accelerator pedal is long, with the result that it requires less effort to operate, and finer gradations of speed may be obtained than with a short pedal. The pedal on the Alco is placed conveniently just outside the bed to the right, and also is longer than usual.

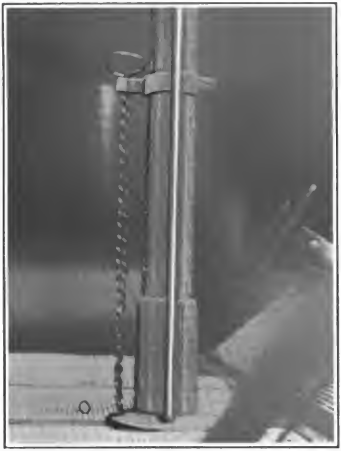
The Premier shows another example of an accelerator operated from left to right, but not attached to the throttle rod. It is conveniently located to the right of the pedals, and possesses the same advantages in operation as does that of the Gramm.

An accelerator operated in much the same manner, but differing in location and design, appears on the Stegeman. This consists of a straight portion projecting through a curved slot in the footboard and is operated with the left foot, from left to right. This type gives great ease in operation, as it is unnecessary to lift the ball of the foot from the floor to make connection with it. Its height above the floor is about two inches.

In the matter of pedals and their functions and position there is little deviation from previous years, the majority of models showing the usual brake and clutch pedals at the right and left respectively. The important factors in the position of the pedals are their distance from the seat and the angle of operation. The former ranges from 10.5 inches with a 21-inch seat to 20.5 inches with a 16-inch seat, the first being a little too short for a tall man and the last a little too long for the average. The angle of operation has received more attention, being in the majority of cases approximately 45 degrees. Others equally easy to operate incline more to a push straight forward, especially in low seated models, the pedals being of sufficient height above the floor to afford a good purchase. It is noticeable that the best arranged designs have the pedals on either side of the steering column, divided by a line from the latter to the seat.

There are a number of good pedal designs for safety and convenience in operation, one of which is the automatic release found on the Autocar and Mack. The operation of the emergency brake releases the clutch, preventing possible damage to the gears should the driver neglect to do so. Pedals that are adjustable to any angle and distance from the seat are to be found on many cars. Such an adjustment is an excellent addition to cab design and is one that will be appreciated by the drivers. The Stegeman appears with pedals that, while not instantly adjustable, are optional with the purchaser as far as the distance from the seat is concerned. The adjustment is made on the shaft, at the factory or later if desired. It requires a little time and cannot be made on the road, but as the same operator will handle a truck for a considerable period, the time is not of great consequence.

Brake and gear levers as a whole are of good length and well placed. There is a tendency to discard the old H slot for the swinging device, which is easier to operate. A good example of this type appears on the Old Reliable. On this, the first and second speeds are at the rear and the reverse and high are at the front. To select the first speed the lever is brought to the rear of the slot and the handle moved to the right, causing the lower end of the lever to swing to the left, bringing the gears in mesh. Moving the handle to the left will select the second speed, and reverse and high are obtained in like manner. By this method the lever swings on the quadrant as a bearing and its operation on a heavy truck requires less effort than did the old H slot operation on a light touring car.



How the Sprag is Dropped on Hills

O—On the Locomobile new five-ton truck, a sprag is fitted for use in hilly country. This is operated from a chain at the base of the steering post, this being drawn up to drop the safety device. Normally the operating loop rests on a boss

A variation of the same type appears on the Lozier. The first speed is at the rear, neutral at the center, and reverse, second and high are secured at the front end.

Various other modifications of the H slot are shown, operating on the same principle. Trucks equipped with a four-speed transmission are provided with an additional slot in the quadrant for the fourth forward speed. Of some variations it might be said that they possess no real advantage over the old form, and have the disadvantage of being a departure from accustomed types without any resulting benefit.

On three 1912 models, Schmidt, Best and Commer, the gear lever is under the wheel on the steering post. The first is a light delivery car equipped with a planetary transmission, and the location of the lever involves no additional mechanical features. It is about 15 inches in length to the right of the post, convenient to the driver's hand. The lever on the Commer is under the wheel at the rear of the post, and operated on a quadrant provided with slots for the different speeds, the rotation being from reverse at the left to high at the right. The truck is equipped with a special design automatic shifting transmission of the selective type, described elsewhere in the COMMERCIAL VEHICLE. The operation of changing gears is as follows: Presuming that it is desired to change from second speed to high, the driver, without releasing the clutch, moves the lever to high speed. The gears are then set for high, but the truck continues to run on second speed. When it is desired to go into high the operator exerts a slight pressure on the clutch pedal or slightly retards the throttle and the change is instantly and automatically made. The advantage of this is that no amount of rough handling to which the lever may be subjected will work damage to the gears. The brake lever, as will be noted in the illustration, is at the right and is of sufficient length, allowing access to the seat, but is a little too far forward to be reached with comfort.

Spark and throttle control is shown in a variety of forms, from the pleasure car arrangement on a quadrant on the wheel to an entire absence of levers with the exception of an accelerator and a dash throttle. The former appears in greater numbers on vehicles having the engine in front, although all forms appear on all types. In a few instances the design is characterized by the absence of all control devices from the wheel, the spark being fixed and the gas controlled by an accelerator and a lever on the dash.

If trucks are equipped with both spark and throttle levers there is much to be said in favor of their location on the wheel. In that position they may be operated with the minimum amount of effort, and on a rough road will not interfere with proper control of the wheel, as the operator's forearm will rest on the wheel even when moving the levers. The heavier trucks can be operated better with the levers below the wheel as, owing to their weight and slower speed, they display less tendency to leave the road. It might be said truthfully that any speed a truck or delivery car should be required to make will not cause that tendency. But trucks designed for suburban and country service, where the greater number of lighter vehicles is destined to be used, must often encounter road conditions that will require the use of both hands on the wheel even at a moderate speed.

An advantage claimed for the location of spark and throttle levers below the wheel is that the slight difficulty in operation will result in a saving of fuel. This is based on fact, but its advantage is often minimized by the addition of a foot accelerator. The latter is even easier to operate than levers placed on the wheel.

When the seat is over the engine the driver has a better view of the road and of surrounding vehicles in congested traffic, and can see more easily what is behind. Accessibility has been brought to a high point in this type. This is particularly true of the heavier models, including the Gramm, Mack, Sampson and G.M.C. The engine is reached readily by removing the sideboards and lifting the footboards, and in some models, including the Harder and Knickerbocker, the radiator is hinged to swing open and allow access to the motor from the front.

Makers who show both types usually adopt the engine in front for lighter cars and the engine under the seat for the heavy trucks. This is a good arrangement, as the former, making more frequent stops, have greater need of a cab that it is easy to get in and out of. The latter are used almost exclusively on long hauls and the driver is not required to leave the seat frequently. In addition to which a helper usually accompanies a heavy truck.

A decided advantage is shown in the equipment of trucks with minor accessories, the majority appearing with either a sight oil feed on the dash or a gauge on the footboard. The operation of dump bodies can in most cases be accomplished without leaving the seat, as is the case in the Mack and Sampson, on which a third lever operates the elevating mechanism. A number of the higher priced products are equipped with air brakes, notable among which is the Saurer 6.5-ton truck. The Locomobile is equipped with a sprag chain.

TABLE OF THE PRINCIPAL DIMENSIONS OF CONTROL PARTS, TAKEN AT CHICAGO SHOW

					3	4	5	6	7	8	9	10
1.	Alco	II	18	31	18	10	9	18	15	..	..	..
2	Avery		18	31	15½	15½	14	18	15½	22½	9½	9
3.	Brush	I	18	24	19½	12	9	14	14½	19	7	..
4.	Baker (electric)		18	28½	8½	7½	16	15½	19	..	..	..
5.	Cartercar (friction)	I	16	27½	4	4	11½	15½	17	17	3	..
6.	G. M. C. (two ton LHD)	I	18	29½	19½	11½	11	18	16	22½	4	14
7.	G. M. C.	II	21	32	7	10¾	11½	22	10½	25	14	14
8.	Gram	II	18	29	14	9	9½	18	16½	17	8	19
9.	Gram	II	16	31	24	14	11½	22	20½	22½	8½	24
10.	Garford	I	18	31	25	11½	7½	17½	13½	13½	5½	12
11.	Garford	II	18	28½	11	9¾	10	20	14	14½	15	24
12.	Locomobile	II	19	25½	15½	15½	8	24	15	18	16	21
13.	Kissel-Kar (fire wag)	I	17	26	22	13¼	8	17¾	16	16½	12	8
14.	Kissel-Kar (five ton)	I	15	26½	15½	12¼	9½	21½	12	20½	7	17
15.	Kelley (fire wag)	I	18	29½	14½	8¾	9	22	12	19	..	..
16.	Kelley	II	19	26	9¼	8¾	7	22	13	19	16	19½
17.	Locomobile (fire wag)	I	19	28½	18	9½	7½	18	14	19	5	..
18.	Knox (fir. patrol)	I	17	32	22	12½	7½	18	17	18	12	14½
19.	Mack (RHD CC)	I	20	28	11½	11	10	18	14½	14	4	..
20.	Pope-Hart. (fire wag)	I	21½	34¼	26	12	7½	18	12½	19	7	11
21.	Pope-Hart. (LHD CC)	I	16	28½	12½	11½	14	22	18	22	7	11
22.	Peerless (RHD & C)	I	18½	28	16½	8½	8	18½	17	23	5½	12
23.	Pierce (RHD & C)	I	18½	26	20	13	6¼	18	15½	22	8	15
24.	Packard (RHD & C)	I	18	27½	13	10	10	18	14	..	..	..
25.	Reo (LHD CC)	I	16½	28	13	9¾	7¼	16	16	18	11	..
26.	Saurer (RHD & C)	I	17	25	30	13	8	16	17	24	5	..
27.	Stegeman (LHD div C)	I	17	27	18½	11½	10	18	13	22	6½	14

1. Height of seat.
2. Height of steering post.
3. Distance from bottom of post to bottom of seat.
4. Distance from top of seat to post perpendicular to latter
5. Distance from top of seat to rear edge of wheel.
6. Diameter of wheel.
7. Distance of pedals from bottom of seat.
8. Height of levers from floor.
9. Distanoce of gear lever from edge of seat.
10. Distance of brake lever from edge of seat.

Measurements taken in inches.

Notes Picked Up at Recent Shows

NEW YORK, Feb. 26.—Rumors to the effect that the Universal Motor Truck Company, recently purchased by H. W. Walton, of New York, had been merged with the Flanders Manufacturing Company, of Michigan, and that both these concerns might be taken over by the General Motors Company, met with denial from the heads of the concerns most interested. However, there is a project on foot to merge the Universal with the Flanders corporation, although the deal has not been consummated so far. It was stated at Mr. Walton's office that if the transaction went through it would not be for several weeks. It was specifically denied that there was anything in the report that a tentative organization to effect this merger had been perfected. The Universal company is capitalized at $350,000 and the Flanders concern has an authorized issue of more than $1,000,000.

The Knickerbocker Motor Truck Mfg. Co. is completing a magnificent concrete factory building on East 150th street near the Harlem river. The new building will add materially to the manufacturing facilities of the company. In a recent accessibility test it was found possible to remove the motor from a Knickerbocker truck in less than 25 minutes.

The Chase Motor Truck Company has just finished a three-story factory addition, 80 by 140 feet. This building will be used for assembly of trucks and will house three of the manufacturing departments of the company.

The Rowe Motor Company will be reorganized in the immediate future under the name of the Rowe Motor Mfg. Co. It is the announced intention of the company to manufacture its cars on a commercial scale.

C. J. Widmer has been appointed general manager of the Eclipse Truck Company. He is the designer of the of the truck and the inventor of the Widmer starter used on it and described elsewhere in this issue under the head of starting devices.

Starters and Starting Cranks for 1912

Mention of the Various Methods in Which Commercial Vehicles Are Started, Including the Present Status of Self-Operating Devices—Folding, Detachable and Other Cranks

WHILE starting devices seem to have been adopted for pleasure cars in the 1912 list with an unanimity which is startling considering their previous absence, no fewer than 60 makers listing them for this season as compared with three or four of a year ago, there is no such tendency noticeable among the commercial car builders, even those turning out both kinds of vehicle.

Reasoning back from this, one can say only that the public demanded them on pleasure cars, hence they were fitted; they have not been or are not now in demand on commercial vehicles, hence the present anomalous situation. Just so soon as there is a popular cry for them, there is no reason to doubt the statement that all of the best and a majority of all the trucks will carry a starter as regular equipment. Until then the business wagon driver must content himself with the old-fashioned crank, subject this year to a few modifications.

To conclude the subject of starters, there are some on the market, and these, by reason of being pioneers in the commercial field, deserve special mention. At the Palace display, Velie and Eclipse were seen, while the Garden showed Saurer and Knox, who will fit the American starter this year. In addition to these, at Chicago the Dorris and Commercial appeared. It is known that the Keeton cabs which have not been seen at any show are now fitted with an explosive gas type of starter, making the present list seven strong, with numberless others willing to furnish any form upon order and at an extra price.

It seems reasonable to assume that the pleasure makers now placing some form upon the touring model will be among the first to apply the same to the commercial output. For this reason, it is interesting to contemplate the following list of firms building both types of car and applying a starter only to the pleasure form at present: Atlas, Bergdoll, Case, Chalmers, Kissel, Lambert, McIntyre, Peerless, Premier, Rambler, Schacht and Speedwell, a total of 12. This added to the previous list of commercial makers now applying a form of starter would make an early total of approximately 20.

Of the forms in use, one is electric, another uses compressed air, two others compressed gas and the balance explosive gas. The point of distinction in the last three lies in the medium used. The Saurer has a compressed air system, in which actual atmospheric air is drawn into a regular compressor driven off of the layshaft of the transmission and by it compressed into a storage reservoir carried at the rear end of the chassis. When the driver wishes to start his car he pulls on a small lever placed upon the dash, which opens the connecting valve and gives the compressed air access to the various cylinders through the medium of a distributor. This directs the fluid pressure into that cylinder in which the piston is ready for the down stroke, and then through its rotation with the crankshaft to the one next in order, and so on.

Considering the compressed gas form, this consists of a collector attached to one of the four cylinders on the motor, set at a very high pressure, say 200 or more pounds, so that it will act only during explosion in that cylinder. At that time the valve will open and a small amount of gas at or above the set pressure will be guided through the valve to a container, usually a steel tank at the rear end of the chassis. In certain cases, this method is modified to take off gas at a smaller pressure, say at 75 pounds, so that it will act during the compression stroke. By this latter scheme an explosive mixture is collected which can be ignited as soon as it is reintro-

Folding Starting Cranks are General This Year

On the Universal trucks, the starting crank is arranged to fold under the front end of the wooden cross member of the frame there for protection. The forward bearing swivels and a clip at the right holds the crank when placed in the horizontal position duced to the cylinders at starting time. The latter form usually would have a method of ignition by means of which a spark could be produced as soon as the gas had been turned into the cylinders.

Grabowsky Folding Crank

The vertical downward position is preferred on the Grabowsky design of folding starting crank. In this, too, the bearing swivels and a clip is provided to hold the crank in position

With the former scheme, however, the pressure of the gas in the tank is sufficient at all times to turn the motor over enough times to pick up the regular flow of gas and regular ignition spark. Neither method takes any appreciable amount of power from the engine, in fact it is a question if the loss could be measured with accuracy so small is it.

The electric method is of two kinds; one a special starting dynamo, the other a method of inducing an ignition spark by a rapid rotation of the magneto armature. In the latter case, this is depended upon to fire the compressed charge left in one cylinder upon stopping, so that the motor starts and immediately picks up its regular functions of sucking in and firing carbureted gasoline. When this is done the magneto armature drops back into its normal position and functions just as any other.

In the first electric method mentioned, the special starting dynamo is energized from a source of stored current, usually a set of storage batteries, this resulting in a very rapid rotation of its shaft for a short time. This shaft is connected by gearing to the crankshaft, and through the medium of a very high reduction the latter is turned over a number of times, sufficient at least to start any ordinary engine. As the dynamo speed usually runs up to 3000 a minute or higher, while no more than 600 would be required at the motor, a five to one reduction gear would be utilized. After the latter has started the electric motor recharges the battery so that it is fully charged and always ready for use.

With the great progress toward electric lighting, the latter system works into the commercial vehicle very nicely, since the one group of accessories will furnish this advanced form of lighting and a sure starting method as well.

As has been stated, there are now few starters on commercial cars, although the situation is one of much promise. The matter of starting cranks, on the other hand, has been given much study and shows the good results of the same. The former position of the crank was such that any impediment or obstruction at the front of the vehicle was liable to hit and damage the same, to say nothing of sliding it into engagement when it forms an extension of the crankshaft and thus transmits the blow or shock to that very important member.

A number of cars were tried with the removable crank, but this was found to cause almost as much trouble as the former method, for it required getting out the same every time it was necessary to start the car. This, too, was followed by the reverse operation of putting it away after the start. Moreover, there was always present the possibility of losing it on the road or elsewhere, leaving it in the garage, or exchanging cranks with some other driver by accident, so that in case of a stop on the road necessitating a start, there was nothing available with which to do this.

This year the plan has been evolved of constructing the important member with a flexible coupling or universal joint somewhere in its length so that it can be folded under the front cross member of the frame. With a growing realization of the necessity for and util-

Self-Starter of the Gas Type and Another Folding Crank

On the Velie three-ton truck shown at the left a starting device of the gas type is provided. The tank is on the right side below the frame, while the starting handle is set into the inclined toe board at the driver's right

The Alco folding form of crank has a universal joint in the middle of the shank length, this when it is in use, being inside of a very long bearing

A Self-Starter of the Compressed Air Form

All Eclipse cars will be equipped this year with the Widmer starter which works on the principle of compressing air with a pair of separate cylinders. This is released by means of a toe button on the dash. The illustration shows a working model of this device

ity of the latter as a radiator protection, practically all cars have them this year in one form or another. Some are of steel, a continuation of the frame side members or an extra front piece, others are of wood, set across the front specially, while still others are a combination of the two, a wood filler piece set into a forward channel or other steel shape.

With the starting crank folded under this there is no possible manner in which it may be damaged except under the most unusual case of a projection which would be just low enough to miss the front fending cross bar and sufficiently high to catch the crank. This is so remote a contingency that it may be dismissed as unlikely ever to happen.

The folding methods are various. Some cranks have a bearing at the front through which they may be withdrawn from engagement with the crankshaft end. Then the bearing being rotatable around its axis, crank and bearing are turned through 90 degrees and turned to any desired position. The latter may be vertically upward or down, or horizontally to the right or left.

Another form has a universal joint in its length and an exceedingly long bearing. When the crank is engaged with the end of the shaft, the joint portion is within the bearing, and therefore is to all intents and purposes the same as a solid shank. After starting, the same can be drawn forward enough so the joint is outside of the bearing, which allows of folding it in any desired direction. Like the others this may be set at any one of the four points of the compass around the crankshaft axis as a center.

In practically all cases where the crank folds under, a spring clip is provided into which the handle or some other portion will fit tightly, so that when out of use and folded under it will hold firmly instead of being allowed to swing around. The latter contingency would be as bad as the old method of a fixed crank.

In the way of dimensions, starting cranks for 1912 are generally heavier throughout. Handles are larger and longer, and a larger number of them are fitted with a loose sleeve or ferrule which can turn in the hand. This allows the driver a better grip and one he can take with less fear of the final result. As for a small or light man handling a truck with a big motor, the longer handle permits him to grasp it with both hands, which is sometimes necessary although not advisable. Longer shanks reduce the necessity for this still further, giving a greater leverage and thus allowing of the exertion of still more force. With the adoption of generally better materials throughout and a realization of what a broken crank would mean, the majority of manufacturers is now utilizing a superior material and a larger cross section.

Quite the largest number are drop forgings of the highest grade, made with an I section, which combines light weight with greater stiffness. It is an unusual thing nowadays to hear of a starting crank breaking. From the former cold rolled steel pin used for the handle portion, this now is made of a forged and turned steel pin of a high grade, noted for its toughness and high resistance to shear. With a brass or other sleeve over this to allow of the hands or fingers turning on it and a device for folding it under the protecting portion of the frame, as much advance has been made in starting arrangements as can be until all of them are done away with and replaced by self-starters of one form or another.

Just so soon as the merchant or other buyer of commercial vehicles appreciates the large saving of effort on the part of his drivers, which the installation of reliable starters will bring, he will insist upon them for the sake of the superior service he will gain, which can be capitalized in dollars and cents to present an almost unanswerable argument.

The Sampson Crank Folds Upward

Another of the many folding forms of starting crank was seen on the Sampson truck. This differs from most of the others in that it folds upward and when out of use lies against the front of the radiator as is pictured here. The bearing swivels as in the other cases

Road Use Restriction Bill in Boston

BOSTON, Feb. 26.—Some of that same spirit that actuated the Bostonians of '75 to resist oppression still lives in the hearts of their descendants, for within the past few weeks there has been uprising that, though peaceful, was none the less earnest and vigorous. The uprising took place among the motor truck men, owners, users and dealers, and they revolted against the plan of the State Highway Commission to have a law passed putting an absurd limit upon the weight and speed of motor trucks and trailers, and placing upon the owner or user of a truck a totally unnecessary burden in the way of responsibility for road damage. As the bill was originally drafted, it made the maximum weight of any truck that could use the public roads without a special permit six tons, including vehicle and load, and the maximum speed eight miles an hour. The bill further carried a weight limit of 800 pounds an inch of tire touching the road, prohibited the use of any flange or rib on the wheels that would injure the road surface, and made it obligatory on the owner or user to pay for the repairs.

Following the initial hearing, the Boston teamsters who use heavy horse-drawn trucks were interested, for it was found that the bill affected them as well as the motor truckmen. A conference was held with the committee and a representative of the Highway Commission and later a general meeting was called at one of the local hotels, at which the trucking interests of all sorts were represented, and it was decided to ask for another hearing.

The Legislative committee gave a second hearing, at which the truckmen came out in large numbers. Meantime the Highway Commission had redrafted its bill, making the weight limit 12 tons including vehicle and load, the speed limit for light trucks 15 miles an hour and for heavy trucks 12 miles an hour. These changes were more satisfactory, but the limit of 800 pounds an inch of tire was retained and also the permit clause and the provision making the owner or user responsible for road damage. At the hearing the owners of trucks presented figures showing the size of their equipment and what would happen in the way of tires 48 inches wide if the bill became a law. Some of the trucks in daily use by Boston concerns carry as much as 2600 pounds an inch of tire, and the owners testified that they knew of no damage to roads as a result of the use of motor vehicles. Some of them said the roads in their coal or lumber yards were made better because the heavy motor trucks rolled them down smooth and hard. The representative of the Highway Commission replied with instances of state road badly damaged and bridges and culverts broken down.

The committee has not yet acted upon the bill. It is thought that it will report some kind of a measure, but that it will be decidedly different from the original bill or even from the compromise measure. It may contain a weight and perhaps a speed limitation. In case a bill is reported that the trucking interests of the State consider inimical to the industry and to the use of trucks, they are prepared to contest its passage before the Legislature and as a last resort to go before the Governor.

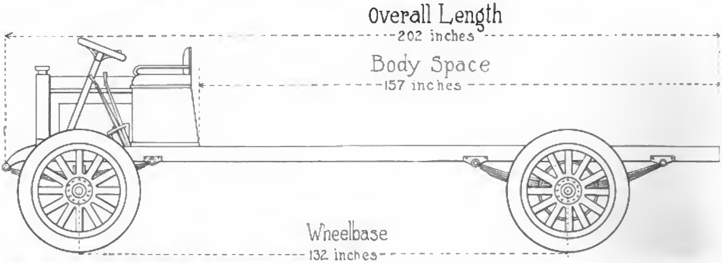
INSTALLING NEW YORK'S FIRE MOTORS

New York City, Feb. 20—Few if any tears were shed yesterday when the formal ousting of the horse-drawn apparatus of Engine 39 at the Fire Headquarters building on East 67th street took place. Despite the fact that the city has in use a large number of motor driven pieces, this is the first to be bought outright, practically all of the others having been placed at work on trial.

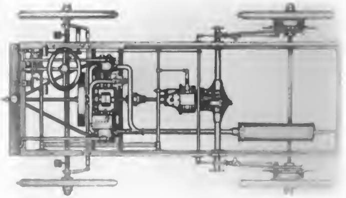
The new engine, shown at the left in the illustration below, is a Waterous, which weighs about 14,000 pounds, has a motor of 126 horsepower, can pump 740 gallons of water a minute and has a rated speed of 40 miles an hour. Under the direction of Chief Kenlon and Fire Commissioner Johnson, the ceremony attendant upon the change was brief, consisting of ringing an alarm by hand for the horses, upon which they were harnessed and run out into the street, the motor being backed in to take their place. The hose wagon shown below was installed at the same time, although this has been in the city's possession for a somewhat longer time.

Motor Pump at the Left and Hose Wagon at the Right, Which Have Replaced Horse-Drawn Apparatus at Engine 39's House, New York City

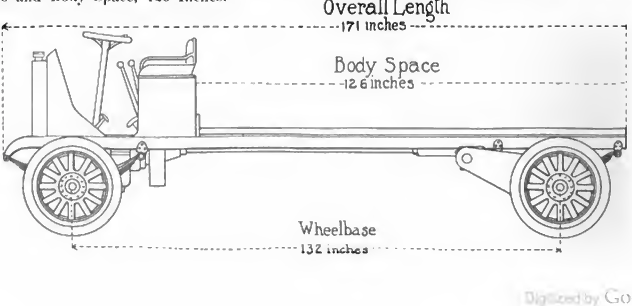
Prevailing Types of Chassis Arrangement

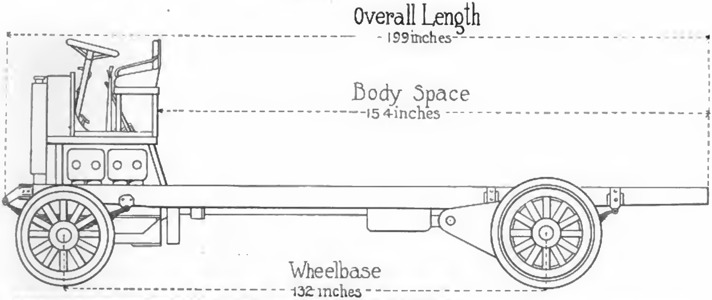


Type A Is the Form in Which the Driver Is Alongside of the Motor. This Economizes on Length as Well as Makes the Engine Accessible. The Average Figures Show a Body Space of 157 Inches for a Wheelbase of 132 Inches, the Total Overall Being 202 Inches. The Photograph Depicts One Form Now on the Market.



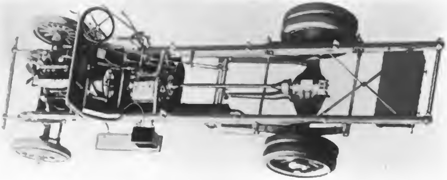
In Type B, the Motor Is Situated Beneath the Floor Boards and the Driver Is Placed Above This. Although Not as Accessible, All Parts Can Be Reached, While the Front Seat Will Accommodate Two or on a Pinch Three. The Average Figures for 1912 Vehicles Give This Type a Length of 171 Inches with a Wheelbase of 132 Inches and Body Space, 126 Inches.

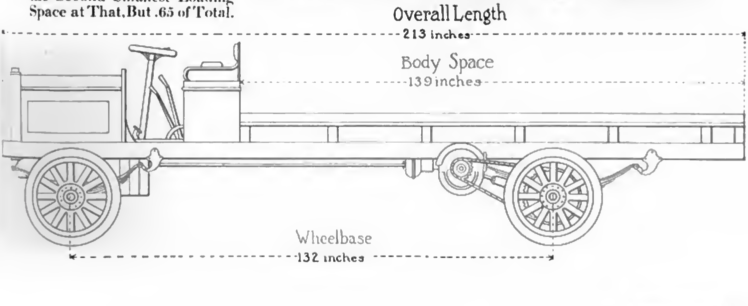




Type C Has Been a Favorite with American Designers But Seems to Be Losing Ground Despite Its Manifold Advantages. The Opponents Claim That the Inaccessibility of the Motor Parts Offsets All Possibilities, While the Driver's Position Over the Engine Requires Constant Climbing Up and Down Which Is Fatiguing.

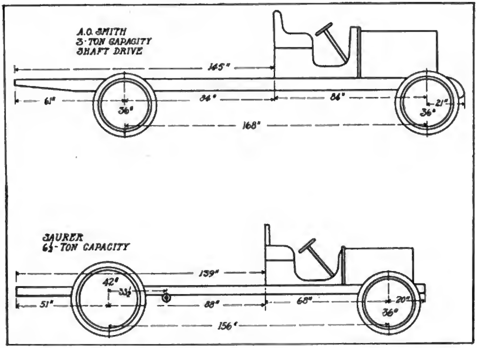
In Type D, the Driver Behind the Engine Following Pleasure Car Practice, the Most Favored Form Is Seen. Although Like Type C, This Is Losing Ground in Favor of Type A. This Has the Greatest Overall Length for Equal Wheelbase on Any Form, While the Average Reveals the Second Smallest Loading Space at That, But .65 of Total.





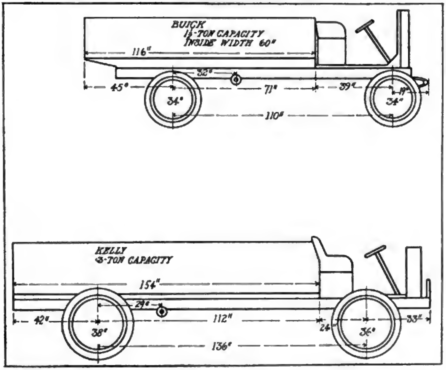
Chassis Length in Various Types Influence

Some of the Cars Seen at the Chicago Show with Details of Their Proportio It—A Study for Manufacturers—Saving New Yo



Two of the Big Trucks Seen at Chicago Display

In the new A. O. Smith truck of three tons capacity, the driver is located back of the motor, which is a vertical four-cylinder unit. With a wheelbase of 168 inches and an overhang of 61, this layout gives a body space 145 inches long. It will be noted that while the back of the driver's seat is exactly in the center between the front and rear wheels, the loading space is not balanced over the rear axle



Some Smaller Vehicles and Their Proportions

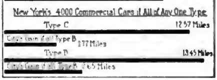
The Buick is of the B type, while the Kelly would come under the A heading. It is interesting to note that the overall length of the former with 1.5 tons capacity is more than half that of the latter with three tons carrying ability, the figures being 174 and 211 inches. This means that a three-ton load carried in two of the smaller cars would occupy 65 per cent. more street space than if handled in one of the bigger cars. To offset this, the speed is 25 mph. against 15

IN the presentation of the various chassis types as on the previous two pages and these two, there is the danger always of arguing from the general to the specific without warrant for the conclusions adopted. The matters of truck efficiency and economy as dependent upon city street congestion are such serious ones, however, that any method which will present a saving is well worth consideration regardless of its evolution or basis.

As presented on pages 20 and 21, there are four general types of chassis; A in which the driver is placed alongside of the motor, a wide frame allowing of a seat on each side; B in which the opposed engine is located under the footboards so that the driver is actually placed above it; C in which the driver is situated above the vertical motor, so as to be very high up in the air, and D in which, following pleasure vehicle practise, the operator is behind his power plant, this being under a hood.

The forms on this page were seen at the Chicago show, and generally speaking represent all four types and all carrying capacities, whereas the former were averages from the whole list of American vehicles, and consequently did not represent any one car. In this respect, too, they present a somewhat illogical difference of space allotted the driver for foot room. In reducing these to equal wheelbases, it was thought that the considerations of turning radius and ease of manipulation would be eliminated or minimized.

The sketches reveal the fact that in terms of the total length, the



Economy of Space and Turning Radius

Showing How Street Space Is Economized With Some Forms, While Others Waste 2.5 Miles of Street—Value of Each Different Form

various forms have a body space equal to just: A, 77.7 per cent.; B, 73.6; C, 77.4, and D, 65.3. In terms of the wheelbase, the percentages are: A, 119.0; B, 95.4; C, 116.5 and D, 105.0. This shows that the valuable, paying space is three-quarters of the whole length in the case of A, B and C, but only 65 per cent. for D. Viewed in another way, if all vehicles were of any one type, the spaces occupied by the four forms in New York City, for instance, with its 4000 commercial cars, would be as per the table below. This shows that the use of form B would save the city respectively: Over C, 1.77 miles; over A, 1.94 miles, and over D, 2.65 miles.

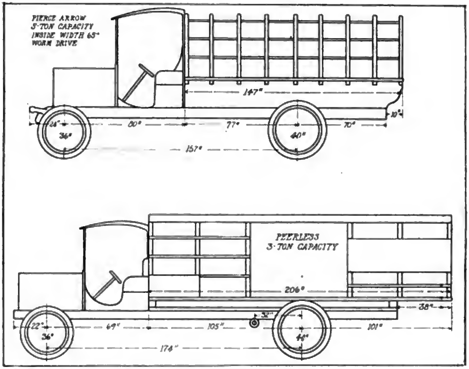
Another thought which is of value in this consideration is the matter of space occupied, both square feet of loading platform area and with an average height, cubical area of contents. The table below gives these figures and show that there are wide differences in the four forms. Thus, to compare two forms at random, D has 24.6 per cent. more length than B and only 10.3 more capacity in either square or cubic feet. On the other hand, the A form, while 18.1 per cent. longer, has 24.6 per cent. more capacity, showing that the extra length is well invested since it brings a higher carrying ability.

In short streets or narrow alleys, or in fact, wherever space is limited, the matter of overall length will be of the greatest value, however, although the others are worth considering. As has been brought out above, sometimes this is modified by reason of a short turning radius with a great length.

DATA OF DIFFERENT TYPES OF TRUCKS.

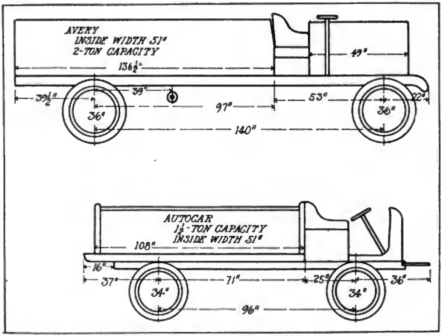
Based on Width of Five Feet and Height of Six

Capacity.	Sq. Ft.	Cu. Ft.	Per Cent More Than B.	Overall P.C. More Than B.
Type A.......	65.4	392.4	24.6	18.1
Type B.......	52.5	315.0	....	....
Type C.......	60.4	362.4	15.1	16.4
Type D.......	57.9	347.4	10.3	24.6



A Pair of Big Three-Ton Cars With Dimensions

Two of the newer trucks from old conservative makers afford a good comparison. The Pierce was a novel brewery body and had slightly more space behind the rear axle than in front of it, while a comparison of overall and loading space show 58.5 per cent. of the total available for load carrying. On the Peerless, the rear axle almost splits the body, but the different motor and driver position produced a higher figure of body space economy, 69.5 per cent.



Comparison of A and B Types in Small Capacity

Although the load space efficiency of these two is widely different, 67.7 for the Avery of type A and only 64.0 per cent. for the Autocar, which belongs in the B class, the load concentration is worth considering. On the Avery, body space is figured on a basis of 352 pounds a linear foot and 130 pounds a square foot, but on the smaller car, the figures are 470 linear and 265 square. This might show that the smaller car was designed for carrying relatively heavier units

The Trend of the Times in Truck Work

Suggestions to Both Parties Interested in the Purchase and Sale of Commercial Vehicles, the Adoption of Which Would Improve Their Efficiency and Increase Their Economy—Various Quick Loading and Unloading Methods

Part II—A Consideration of the Electric Vehicle

Digest of Part II

BESIDES the maker, there are three big influences back of the electric commercial car, all interested financially in furthering it.

ONE trouble in the past has been the refusal of buyers to accept recommendations from the better informed car manufacturer. This is particularly unfortunate for the small firm to whom a wrong purchase means so much.

OPERATING costs divide naturally into three parts, tires, batteries and mechanical parts. If guaranteed at all, each of these should be backed up by its specialized maker not by the builder alone.

THE car manufacturer should assume a just responsibility for the parts of his own make but should not be required to assume labor charges for making repairs or replacements of parts.

THE time will come when guarantees will be eliminated as unnecessary. Until then, instead of helping the user and paying for it, too, the manufacturer should insist upon the latter paying for his education.

ANYTHING that can be done by horses in merchandise delivery can be done by electric vehicles. This work divides into four parts, each with its special considerations and preferred type and size of vehicle.

THE electric truck or commercial vehicle is no experiment, since it is merely a modification of the street car. The principal and expensive apparatus constituting it is produced by the same large industrial electric firms that produce all of the staple apparatus of the electric utilities used in this country at present.

There are four large influences at work to co-operate with the users of electrics so as to insure them permanent satisfaction. These are: First, makers of complete vehicles; second, makers of electrical apparatus like the General Electric, Edison and Westinghouse companies; third, the manufacturers of storage batteries, and fourth, the public service current supply companies or electric light companies. These have a more permanent interest in increasing the use of electric trucks than any of the other three interests, since to the latter every electric vehicle sold becomes a permanent revenue producer. One large electric truck will consume more current than a block of city residences, and a pleasure car more than three residences.

The buyer of electric vehicles has the insurance of permanent and satisfactory operation, since if the initial installation of vehicles be not suited to his work the vehicle equipment can be modified to give him those characteristics which he may require. To explain: The principal part of the power plant, the battery, is susceptible to many changes or additions without prejudice to the original investment, and the same holds good with regard to readjustment of motor equipment and of speed regulation by changing the gear reduction. Suppose a department store starts out, as many have done, with electric vehicles having speeds which prove too high for congested traffic or to permit operating over as wide a range as desired, a change of gear reduction to produce an economic speed and also to extend the range of operation with a greater mileage on each charge is possible and can be made readily. Again, if the performances of the vehicle were satisfactory for level roads, but not for grades and hills, a modification of battery equipment and gear reduction can be made so as to have the original vehicle entirely satisfactory under previously unforeseen conditions. To be specific, if a merchant in Kansas City has a vehicle that will travel 15 miles an hour on the level, but will not make time on the hills, he can change it so as to give a lower speed on the level, but a better hill-climbing ability.

In a general way this may be explained as follows: If the original battery consisted of 44 cells of 17 plates each weighing approximately 2350 pounds, it may be more economical in hilly territory to rearrange this so as to have two of 44 cells, each consisting of but nine plates, thus each battery would weigh but little more than 1200 pounds, and with a suitable change of the gear reduction one battery will perform the service required in the forenoon, the other in the afternoon. The change of battery at noon is a small matter with modern apparatus, in that it can be accomplished in less than three minutes. With this battery modification the load on the vehicle is reduced practically 1150 pounds during the entire day, and if the original weighing 2350 pounds would give an actual radius of 40 miles on a charge, there should be an increase to 50 or 60 miles a charge under the two-battery arrangement.

Buying Correct Equipment

One great trouble with electric car installations is that it has been very difficult to get the buyer to accept that which the vehicle maker thinks best for him. The buyer has preconceived ideas of what he needs and should have. He has his friends who pretend to know something of electric vehicle installation, and these people generally prejudice his mind. What is needed is an installation expert who can give definite figures on each case.

The big question with the buyer is, How shall I know what installation is right for my business? The difficulty encountered in attempting to solve this question is how and where he can get competent guidance in selecting and applying his installation. If he were confronted with the problem of superseding his present elevator or steam power plant it would have a ready solution, since these lines of industry are well developed and he naturally would call on some of the many estabished authorities to advise him. Unfortunately, at the present time there is a dearth of competent talent in this new field of electric transportation, and it is well known that there are only a few authorities on the subject who are qualified by any extensive and large-calibre experience to render the service required. This being the case, many prospective buyers of electric vehicles have been misled by calling upon structural or mechanical engineers, who, though qualified in other older lines of engineering, are certainly neophytes in this. Many unfortunate examples can be pointed to as object lessons of this misguidance.

A few of the large builders have recognized this condition and have monopolized the talent available, but on the other hand they are prepared to extend the information thus available to those interested in the employment of their particular product. Unquestionably such sources of data are of great value to the prospective buyer, and the experience accumulated by the extensive and varied field of application constantly under investigation insures those taking advantage of such facilities more competent service than could be obtained otherwise.

Digest of Part I, February Issue

THE question with sober-minded observers is—has the introduction of motor vehicles been accompanied by increased efficiency sufficient to induce a rapid increase in their use, that is, have users divested themselves of prejudice and dealt with the truck fairly and squarely?

DURING the introductory stages of an economic innovation the margin of price over cost must be high to equalize extraordinary expense of marketing and introducing it. That buyer who enforces a lower price with consequent diminution of profit is seldom the gainer in the end. Hearty cooperation assures progress from the outset.

OF ALL the problems, transmission and transportation stand out at once as the most difficult and the most successfully developed. Of these that of vehicular transport is most complex.

ONE of the most difficult tasks is to make the owner assume the obligation of solving his own transportation problem as well as he handles the difficulties in other departments. Too often, the real weakness exists within the merchant himself, in his mental indolence toward the new methods.

MANY inquiries are coming from building material supply houses, urged on to devise means for minimizing all delays. In this field it is difficult for the commercial vehicle manufacture to reduce the expense without auxiliaries.

In individual cases, where business houses purpose buying one or two cars, the buyer must proceed more or less on his own resources. He may be quite competent to do so, but where a large installation is at stake, as in making installations of 20 or more vehicles, the insurance against risk of wrong application and considerable experimentation is worth a great deal to the investor, who must act accordingly.

Basis of Cost of Operation

The question of electric vehicle operating costs resolves itself into three vital elements of maintenance, which are the unknown quantities so far as the purchaser is concerned. These are the upkeep cost of tires, batteries and wearing parts. Due to the evolutionary development taking place in substituting motor trucks for horses, with incidental large investments, the investor is beginning to demand an advance statement concerning these figures or to insist upon some form of insurance that the economy will be realized by a definite limitation of maintenance figures below a given maximum.

For example: Supposing a department store has a competent investigation made of its delivery system and it becomes evident that $20,000 a year may be saved by a complete installation of electric vehicles, the first question the management becomes perplexed about is what assurance it can obtain that the expected cost of maintenance will not be exceeded. And, logically or illogically, the merchant, who seldom if ever guarantees his own wares, immediately demands of the vehicle manufacturer a maintenance guarantee. The maker is asked, in a word, to underwrite, with all its uncertain contingencies, the cost of the merchant's delivery. To this he is forced to answer that he cannot guarantee a truck performance which he cannot control and which is beyond his province as a manufacturer. Naturally, under the operation by the merchant of his own delivery department, drivers, routing, schedules of service, etc., no outsider reasonably could be expected to assume any obligation. This has been one of the great impediments to the introduction of big installations, and any attempt to guarantee where divided responsibility exists unfortunately fosters those conditions certain to produce failure of the expected performance, which is so irritating and expensive to both buyer and seller.

It is only by some co-operative arrangement where the burden is shared by the battery maker, the tire maker, the vehicle maker and the operating merchant that the latter can get the assurance covering maintenance cost that he needs.

What is the tire maker doing to remove this impediment to the introduction of large vehicle installations? He is guaranteeing a certain mileage on his tires, which ranges from 7,500 to 10,000 miles, with the stipulation that if this be not secured allowance is made for the unattained mileage on the previous set when purchasing the next set of tires.

The Tire Makers' Attitude Wrong

In such a blanket arrangement the tire makers are in error in not differentiating between what is known as continuous and declining load services, because the wear is vastly different in each. Continuous load service refers to transportation in which the vehicle is operating to its full load capacity all of the time, as compared with declining load service in which the vehicle starts out on, say, an eight-mile journey, reducing its load by actual delivery until it is eventually gone and the vehicle returns empty to headquarters. It can be at once seen that tire consumption under continuous load service is easily three times the tire wear under declining load service, particularly in those instances of declining load service where the return trip is made without any load.

Furthermore, there is no distinction between the speed characteristics of the two services, which have an enormous influence upon tire wear. A truck traveling 16 miles an hour certainly will have three times the tire wear of the same vehicle under similar conditions at eight miles an hour. This is true particularly of the large-size vehicles. Failure to differentiate the characteristics of service in tire guarantee is what brings about the dissatisfaction resulting from short mileage and tire life.

How the Tire Wear Can Be Measured

The ultimate solution of this problem will resolve itself into measuring the tire wear in exact relation to the electric power consumed, which even at this day can be measured accurately and recorded. This is one feature in which the electric vehicle has a distinct advantage over the gasoline type. In other words, the time is not far distant when it will be possible to determine exactly the tire consumption in pounds of rubber proportional to the kilowatt-hour expenditure of electric power in the performance of the vehicle's service. It will be practicable to buy tire service based either on mileage or on periodic performance with due reference to load characteristics.

In the matter of battery guarantee something must be looked for from the battery manufacturer. Although at present some are issuing life guarantees based on the number of charges, the mileage or a definite number of years irrespective of service, rational development in the battery field should tend towards the possible purchase of battery service over a given period with due regard to the matter of the performance required. To-day there is much diversity of practice in the battery field induced by competition and some few manufacturers actually are offering guarantees which invite failure from the start by their extravagance, but they think the possibility of securing large installations is worth the risk assumed. This liberality, as a matter of fact, is a serious incumbrance to progress as responsible manufacturers will not assume such unwarranted risk, and the weaker ones are crushed out by the burden, while the industry suffers in the meantime.

Guaranteeing the Wearing Parts

A guarantee of the mechanical wearing parts of a car devolves upon the manufacturer of the vehicle. If the impediments which the maker has encountered heretofore in guaranteeing the operating expense have been dissipated in such a manner that the burden of tire and battery material upkeep can be shared by their respective makers, he is unquestionably in a position to assume a just responsibility for the upkeep of that portion of the machine which is of his own manufacture. In other words, he no longer can avoid giving a fair assurance that at least the price of upkeep for renewal of the machine's wearing parts will not exceed a definite maximum in a given period. In so doing it should not be incumbent on him to assume responsibility for garage labor in the replacement of parts under natural wear and tear, since this is not under his control. The merchant-operator of the vehicle should have no hesitancy in assuming responsibility for this end of the maintenance, which is entirely under his control.

There are at present a number of manufacturers issuing fictitious guarantees, which the buyer, due to his ignorance of the subject, at first glance interprets as complete maintenance and upkeep guarantees. When these are investigated rigorously they can be interpreted only as contracts to buy all of the necessary spare parts at the factory of the manufacturer, without any reference whatever to the cost of maintenance of the vehicle, which must necessarily involve labor and other vital items.

Eventually Guarantees Will Be Eliminated

Of course, looking at the general subject broadly, a time will come when there will be no more necessity for one than there is for a guarantee to-day in the case of buying a pair of shoes or ordering the groceries for the week. At present it must be recognized that the phenomenal growth of the commercial vehicle business has tended to upset existing conditions or bring about revolutionary changes. The slothful mental attitude of the ordinary merchant has not been prepared for these as he is accustomed to being prepared to other normal evolutionary lines of industry or economic changes. In the frantic attitude which he assumes to secure some protection in the upheaval from one practice to another he clamors for abnormal, unorthodox and inconsistent assurance which elsewhere considered would be ridiculous.

During the spoon-feeding process of inducing the merchant to make the change from horses to motor delivery, he ought to be made to pay a high price for having the vehicle maker lead him through what he believes to be the bewildering difficulties of his first few years of mechanical vehicle operation. Therefore, a most consistent procedure on the part of the latter, if they can align themselves solidly for an effort against their common difficulty, would be to insist upon a premium which would compensate them adequately for issuing the guarantee or insurance demanded. This could be accomplished in a variety of ways, one of which would be to place the maintenance figures at what might be the natural expectation of such cost and to compel a buyer to share responsibility by an equal division of the difference between the actual cost and the figures set as the maximum, a nominee of the manufacturer being employed by the user for operating the plant. This method would have the advantage of compelling the user to pay such a high price for his nursing as would induce him to end the guarantee arrangements at an early date, and in the meantime would act as an incentive to both maker and user to keep actual cost of operation as low as possible during the guarantee.

Another way in which the manufacturer would get better treatment in the matter of guarantees would be that, having set the maintenance figures at a safe small margin above the anticipated cost, to compel the user to pay the entire amount indicated during the guarantee period. This would afford the manufacturer a much larger and more definite revenue than would result from the first practice, but with the disadvantage that the user does not gain the complete economical advantage of the machine installation while this guarantee is in existence. This might be detrimental to the more rapid sales progress expected under the former method.

The Headings Under Which Costs Are Considered

In estimating the cost of operation of electric vehicles, as well as gasoline vehicles, it is best to consider the subject under four heads, namely, Fixed Charges, Maintenance, Garaging and Operation.

Fixed Charges—These should include the interest on investment in vehicles and equipment and depreciation on the non-wearing parts of the chassis such as frame, axles, steering gears, springs, etc., at a figure which will provide a sinking fund for their repurchase when they become useless from a service viewpoint or obsolete. Actual practice in the use of electric vehicles in New York shows them in good serviceable condition to-day after the machines have been in use over 10 years, and for this reason depreciation at 10 per cent. a year is fair.

Maintenance—Under the head of Maintenance comes the upkeep of tires, batteries and mechanical wearing parts of the machine. This should include not only battery material, new tires and new wearing parts for the car required under normal service, but the charges for mechanical labor necessary in making these replacements.

Garaging—Garaging should cover garage labor due to storage, washing and the incidental attention which the vehicle needs in service, and also rent, light, heat, water, etc., as well as fire insurance, etc.

Operation—Operation covers such expenses as are incurred in performing delivery duty, as drivers and helpers' wages, accident and liability insurance, charges for loss and damage to goods during delivery, cost of additional delivery service in cases of exigencies, as well as licenses, etc.

The charges making up such a schedule of operating cost are well known and founded on fact due to the numerous large installations of electric vehicles which have been made during the past 10 or 12 years. Further, the science of designing electric vehicles is an exact procedure and has been handed down to us from the street car industry. For this reason the machine can be manufactured and operated under methods of precision which are not likely to prevail in any other branch of the motor vehicle industry for some years to come.

Almost all of the large commercial vehicle installations existing in this country to-day are made up of electric vehicles and we may prove this by citing the fact that the following 43 installations include 2000 machines and represent an investment of $10,000,000:

Notable Large Electric Commercial Fleets

	No. of Cars
Adams Express Company (Express Business)	320
Ward Baking Company (Bakery)	200
American Express Company (Express Business)	153
Case & Martin Company (Bakers)	100
Gimbel Brothers (Department Store)	96
New York Edison Company (Public Service Corporation)	95
United States Government (Mail Delivery, Navy Yard Supplies)	75
Ward-Corby Company (Bakery)	64
Anheuser-Busch Company (Brewery)	57
Rochester Railway & Light Company (Public Service Corporation)	52
General Electric Company (Manufacturers)	44
H. C. Piercy Company (Delivery Contractors)	43
U. S. Express Company (Express Business)	43
Jacob Ruppert Company (Brewery)	42
George Ehret Company (Brewery)	42
R. H. Macy & Company (Department Store)	39
James A. Hearn & Son (Department Store)	35
Edison Electric Illuminating Company of Boston (Public Service Corporation)	34
Peter Doelger Company (Brewery)	31
Commonwealth Edison Company (Public Service Corporation)	29
Frederick Loeser Company (Department Store)	26
Motor Delivery Company (Delivery Contractors)	26
F. A. Poth & Sons (Brewers)	24
Independent M. & D. Service (Delivery Contractors)	24
H. B. Claflin & Company (Wholesale Dry Goods)	23
United Dressed Beef Company (Wholesale Meat)	22
Tiffany & Company (Art Goods)	21
Abraham & Straus Company (Department Store)	20
Schwarzschild & Sulzberger (Wholesale Meat)	20
Sulzberger Sons Company (Wholesale Meat)	19
Marshall Field & Company (Department Store)	19
Gorham Manufacturing Company (Art Goods and Jewelry)	17
Arnold, Constable & Company (Department Store)	16
Edison Phonograph Company (Manufacturers)	15
Siegel-Cooper Company (Department Store)	15
Central Brewing Company (Brewery)	14
Chapman & Sachs Company (Ice Cream)	13
N. Y. Butchers' Dressed Beef Company (Wholesale Meat)	13
C. Schmidt & Sons (Brewers)	13
Gambrinus Brewing Company (Brewery)	12
Public Service Electric Company (Public Service Corporation)	12
J. Taylor Dry Goods Company (Department Store)	10
United Electric Light & Power Company (Public Service Corporation)	10
Total companies, 43.	1998

The foregoing list represents the larger installations and but a small proportion of the total number in use in almost every part of the country. Another significant fact is that 95 per cent. of all the commercial electric vehicles installed in the past 10 years are still in service. This ought to prove the stability of investment.

Characteristics of Service

The field of utility for electric vehicles is practically that field in cities at present covered by the horse. Anything that can be done with horses in the line of merchandise delivery can be done with electric vehicles. The transportation of merchandise in cities comes under four grand divisions as follows:

1—**Freight Transfer**—This includes handling of incoming and outgoing freight between warehouses and railroad and steamboat terminals.

2—**Wholesale Merchandise Transfer**—This applies to the transportation of wholesale merchandise between warehouses and retail stores.

3—**Merchandise Distribution**—This covers the distribution of merchandise between store and customer.

4—**Express Service**—This consists of merchandise transportation direct from terminals to distributing depots, and also from these distributing depots direct to merchants and customers.

Freight Transfer (1)—The characteristics of this field of work are heavy loads, short distances and delays due to traffic congestion at railroad and steamboat terminals and also to some extent at warehouses. The economic difficulties are taken care of generally by the heaviest type of truck or motor vehicle, which reduces the number of inactive drivers. In other words, instead of using three two-horse trucks with three drivers standing in line for 50 per cent. of the day, the work can be done with one five-ton motor truck, so that only one driver's wages would be spread over the inactive period instead of three, and if the truck were equipped with mechanical devices for loading and unloading the time for these operations would be reduced to a minimum. Drivers are 50 per cent. of the expense of operation in horse service, and if by supplanting three horse vehicles by a five- or seven-ton truck one man can be substituted for three, this will make a reduction of 66.6 per cent. in the labor charge, which gives a final reduction of 33.3 per cent. in the total cost of delivery.

The employment of such quick loading and unloading devices will eventually prevail on railroad and marine transportation companies as to segregate the horse vehicle from the motor vehicle and provide a separate platform for the motor truck. The only impediment to this is the inconsistencies of Interstate commerce laws, which restrain such transportation companies from preferring some of their customers with such facilities over others.

To explain: One of the methods which might be adopted to bring about a segregation of the horse vehicles from the motor is: If a railroad company were to erect or allot a platform at its freight houses fitted with mechanical loading and unloading devices especially suited to conform with the mechanical equipment of motor trucks to handle loaded body crates, loaded platform trucks, etc., whereby the merchandise can be transferred in large units with the use of cranes, winches, conveyors, elevators, etc., this would develop a section of platform

(*Continued on page 58*)

Buyer's Guide to 191

Compact Tables of the Principal Americ Purchaser in Narrowing His Choice Do Classes According to Type of Pow General Divisions Used Previous

Up to 1000 Pounds

Name and	Capacity	Price	Horsepower	Wheelbase	Overall Length	Tires	
						Front	Rear
New Era	400	$425	6.0	72	116	26x3	26x3
Maxim	500	395	8.5	90	125	28x2.5	28x2.5
Reo	500	600	12.0	78	...	29x3.5	29x3.5
Auburn	600	685	13.6	77	103	30x3	30x3
Brush	600	487	10.0	88	64	34x1.3	34x1.3
Dispatch	600	700	....	96	...	36x3	36x3
Duryea	600	500	12.0	84	126	x1.5	x1.6
Kearns	600	900	20.0	100	...	36x1.2	36x1.5
Best	800	....	12.0	76	116	32x2	34x2
Chicago Bus	800	....	14.0	87	125	38x2	38x2
Detroit	800	740	16.0	100	132	32x2	32x2.5
Lincoln	800	575	14.0	87	144	38x2	38x2
McIntyre	800	650	13.0	...	...	x1.3	x1.3
Overland	800	900	30.0	106	146	33x4	33x4
Acorn	1000	....	20.0	96	136	34x2.5	34x2.5D
Beyster	1000	1250	20.0	106	110	x3	x3.5
Blacker	1000	650	13.0	86	...	30x3	30x3
Board	1000	1375	28.0	110	168	34x2.5	34x3
Buick	1000	1000	22.0	94	139	32x4	32x4
Champion	1000	2500	35.0	124	168	36x3.5	36x4
Cino	1000	2000	40.0	113	157	34x4	34x4
Dispatch	1000	900	....	120	...	36x3.5	36x3.5
Economy	1000	....	20.0	100	...	....	....
Ford	1000	700	22.5	100	...	30x3	30x3.5
Geneva	1000	1350	20.0	96	144	34x2	36x2.5
Gleason	1000	1050	20.0	48	96	36x2	36x2
Hatfield	1000	850	20.0	90	108	x2	x2.5
Herreshoff	1000	950	18.3	100	...	32x3	32x3
Internation'l	1000	....	14.0	84	...	x1.7	x1.7
Jonz	1000	800	22.0	96	...	32x3.5	32x3.5
Lambert	1000	1250	20.0	100	...	38x2	38x2.5
Landshaft	1000	950	20.0	86	...	34x2	36x2
Martin	1000	1400	16.2	94	...	34x2.5	34x2.5
Mercury	1000	750	14.0	85	108	38x1.7	40x1.7
Merit	1000	1000	18.0	88	131	35x2	35x2
Modern B.	1000	1200	22.0	110	...	33x4	33x4
Regal LB.	1000	1050	30.0	107	154	32x3.5	32x3.5
Rogers	1000	800	18.0	100	142	36x2.5	36x3
Schmidt	1000	1025	18.0	90	144	36x2	38x2
Sullivan	1000	1050	18.0	92	141	36x2.5	36x2.5
Van Dyke	1000	850	22.0	86	126	32x3	32x3
Warren	1000	1350	30.0	110	150	32x4	32x4

1001 to 2000 Pounds

Name and	Capacity	Price	Horsepower	Wheelbase	Overall Length	Tires	
						Front	Rear
Auburn	1200	750	20.0	86	...	34x1.7	34x2
Crawford	1200	1200	27.3	115	...	34x3.5	34x4
Klinekar	1250	1250	....	86	...	36x3	36x3
Siebert	1250	1000	20.0	100	...	36x2	36x2
Atlas	1500	1750	20.0	102	144	32x4.5	32x4.5
Cartercar	1500	1250	18 0	98	138	34x2.5	36x2.5
Chase D.	1500	900	20.0	100	144	36x2	38x2
Coleman	1500	1250	20.0	100	144	x2.5	x2.5
Cortland	1500	970	16.0	84	...	36x2.5	36x2.5
Crown	1500	1200	26.0	104	168	36x2.5	36x3
Dart	1500	650	16.0	80	123	x1.7	x1.7
Denniston	1500	2000	15.0	96	136	32x4	32x4
Dorris	1500	2400	30.6	132	...	34x4	34x4
Gaylord	1500	1500	30.0	112	150	32x4	32x4
Ideal	1500	1500	24.0	109	153	36x2.5	36x3
Johnson	1500	1600	40.0	112	147	34x3	34x3
Kearns	1500	1150	20.0	100	136	x2	x2
Kisselkar	1500	1750	30.0	120	...	35x4.5	35x4.5
Lincoln	1500	785	14.0	87	144	38x2	38x2
Lip.-Stew't.	1500	1675	20.0	115	162	34x4	34x4
McIntyre	1500	950	22.5	96	...	x1.7	x2
Martin	1500	1400	16.2	94	...	36x2.5	36x2.5
Maytag-Msn	1500	....	20.0	...	...	32x3.5	32x3.5
Menominee	1500	1200	25.0	112	163	32x3	32x3
Modern	1500	1600	30.0	114	...	36x3	36x3.5
Monitor	1500	1050	20.0	100	124	33x2.5	34x3
Mora	1500	1000	16.0	94	150	36x2	36x2.5
Oliver	1500	1400	24.0	100	...	38x2.5	38x2.5
Philadelphia	1500	2000	25.0	112	...	32x4	32x4
P H P.	1500	1050	30.0	102	...	30x4	30x4
Rassel	1500	1500	....	96	...	36x2.5	36x3
Reo	1500	750	12.0	90	144	36x2	36x2.5
Rowe	1500	2250	28.9	120	...	34x3.5	34x4

IN THE selection and ultimate purchase of a commercial vehicle, the man who is about to spend several thousand dollars for what is destined to revolutionize his transportation methods, should go very slow. If he does not have in his employ a competent mechanical engineer, or knows one, he would do well to visit some good consulting man in that line. Even though an engineer may not know motor trucks, the buyer will have doubtless a few makes in mind of which he knows something and between which he wishes to make a selection. In this final choice, his technical friend can give excellent advice on good and bad features of construction, in which the merchant might be more or less weak.

Where possible, a specialist in this line should be consulted, or, if that be impossible, the buyer should refer to a company which retains such a man and should put up to it or him the exact situation. It is believed that such a man will be broad enough to advise correctly which form of power and which sizes would be fitted best to this particular business without actual reference to the concern he represents except as the prospective buyer's business would require something made by that concern. While such firms and men are few in number, there are some available.

Information Is Made Compact

Referring back to the lists, it will be noted that these present a minimum of information, the idea being to show at a glance the few items which a merchant would have in mind when he started to select a commercial outfit. First of all he would have an idea of the carrying capacity he required and the price he would be willing to pay, this being variable within a few dollars but not by any large amount. Next, as previously mentioned, he would have in mind a few car names, either those owned by friends, acquaintances or business rivals, or others which are national advertisers and thus known as a name, at least, to everybody.

Next, if he owned a pleasure car, he would realize at once the utility and necessity for sufficient power to overcome any road conditions the vehicles would be likely to meet. As soon as he began to give consideration to its use in his yard, alley where loading was done or its passage through the streets of his city, the question of wheelbase and tread would arise. Was the wheelbase too long or too short? With tread he would be concerned to have a width which would prevent his drivers from running in car tracks and thus spoiling tires. So soon as he considered the loading, overall length would be an item of importance considering the type of body he had in mind. If this were too long he might have to give up his present method and go to much additional expense.

As soon as he began investigation, or so soon as two

ommercial Vehicles

hicles Classified to Guide the Prospective
a Few — Divided Into 11 Arbitrary
d Capacity. These Follow the
the Complete Specifications

vehicles or more were selected which seemed to meet all other requirements, the matter of tire sizes would be met. Makers differ in this, for some are more liberal than others in diameter and cross section. This results in large guarantees, for a vehicle which is overtired can be guaranteed much more easily and safely for a given mileage or length of life than one which apparently is under equipped. In this both the wheel diameter and the width of rubber enter. On heavier trucks, also, it is helpful to know the use of singles or dual tires in the rear. Thus, the attendant tables contain just this information and no more.

Arranged in order are: Car name, capacity in pounds, horsepower, wheelbase, overall length and front and rear tire sizes. Beyond this, the vehicles are grouped in natural classes as follows: Up to 1000 pounds, from 1001 to 2000, from that figure to 3000 pounds, 3001 to 4000, 4001 to 5000, 6001 to 8000, 8001 to 10,000 and the heaviest class above 10,000. In addition the various sizes of electrics are given and such municipal, sightseeing and gasoline electrics as are available.

Salient Points to Bear in Mind

In utilizing these lists, the prospective purchaser should bear in mind that they are but partial lists and do not pretend to give anything like all of the information available relative to these makes of cars, constituting all those on the American market for 1912. The idea is to utilize these pages only for a preliminary selection, after which a reference to the more complete tables published previously will bring out additional information of great value and allow of a further narrowing down of the cars selected.

Following the second survival of the fittest, a visit should be made to the nearest salesroom or agency where these vehicles are visible. There a close inspection can be made and detailed inquiries put to bring out the points not apparent. Even in this respect, it is advisable to write the factory for the same or very similar information, as it is a fact that many of the present commercial car salesmen, too many, in fact, are but recent graduates from the pleasure line and have not become fully cognizant of the finer points of the former type of vehicle.

Sooner than admit a lack of knowledge of the cars they are supposed to know intimately, these men will state as facts, sometimes, things which not only are not exactly correct, but which in principle are misleading. For instance, a salesman detecting signs that an interested prospect is about to leave without stating anything definite as to his opinion of the vehicle under discussion, will often resort to the practise of revising previous statements to make the vehicle appear in a more favor-

Name and Capacity	Price	Horsepower	Wheelbase	Overall Length	TIRES	
					Front	Rear
Sampson....1500	....	18.0	94	142	34x4.5	34x4.5
Schacht....1500	1585	40.0	120	158	34x4	34x4
Sullivan. .1500	1000	18.0	110	150	36x2.5	36x2.5
Veerac.....1500	850	20.0	82	138	35x4	35x4
Victor......1500	1700	25.0	105	...	34x2.5	34x3
Webster....1500	....	16.0	93	132	x1.7	x1.7
White......1500	2100	30.0	120	170	34x4	34x4.5
Whitesides..1500	1500	30.0	118	...	x2.5	x2.5
Willet......1500	1800	30.0	110	...	34x4.5	34x4.5
Adams.....2000	2100	30.0	121	200	36x3	36x3.5
Atterbury....2000	....	25.6	125	...	36x3.5	36x4
Bessemer...2000	1950	20.0	105	160	34x2.5	34x3
Blacker.....2000	2250	25.0	98	...	32x4	32x4
Board......2000	1975	32.0	120	183	36x3.5	36x4
Buckeye....2000	1800	35.0	...	...	....	....
Cass........2000	1850	30.0	116	192	34x3.5	34x4
Chase......2000	1400	20.0	106	156	36x2	38x2.5
Clark.......2000	....	24.0	102	...	36x2.5	36x2.5
Clark.......2000	2000	30.0	100	156	36x3.5	36x4
Decatur....2000	1800	30.0	129	...	32x3	32x3.5
Dominion...2000	2850	35.0	110	175	36x4	36x4.5
Federal.....2000	2100	30.0	110	167	36x3.5	36x4
Franklin....2000	2500	18.0	94	147	36x5.5	36x5.5
Garford.....2000	....	26.0	125	162	34x3	34x3.5
G-M-C.....2000	2300	20.0	126	179	34x3	34x4
Grabowsky..2000	....	28.9	121	...	34x3.5	34x4
Gramm... .2000	2000	....	106	162	34x3.5	34x3.5
Hart-Kraft..2000	2000	30.0	118	174	34x3.5	36x4
Hatfield....2000	1200	20.0	96	116	x3	x3.5
Hewitt.....2000	1800	17.0	94	156	36x3.5	36x4
Ideal.......2000	1750	24.0	115	172	36x3	36x3.5
Indiana.....2000	2000	30.0	120	195	34x3	34x4
Kisselkar...2000	2250	40.0	132	...	37x5	37x5
Lambert....2000	....	....	...	...	36x3	36x3.5
Landshaft...2000	1250	20.0	96	...	34x2.5	34x2.5
Lauth-Jgens2000	1650	24.0	104	185	32x3	32x3.5
LeMoon....2000	2000	35.6	127	...	36x3	36x3.5
Little Giant.2000	1100	20.0	90	144	36x2	36x2.5
McIntyre...2000	1300	22.0	119	...	34x2.5	34x2.5
Mack.......2000	2500	32.4	126	192	36x4	36x2.5D
Martin......2000	1750	16.2	...	...	36x3.5	36x3.5
Maytag-M'n.2000	....	20.0	...	...	34x2.5	34x3
Monitor.....2000	1750	24.0	100	...	36x3	36x3.5
Natco......2000	....	20.0	104	156	36x3.5	36x3.5
Oliver......2000	2300	24.0	118	...	36x3.5	36x3.5
P-H-P......2000	1500	30.0	115	174	34x3.5	34x3.5D
Plymouth...2000	2100	28.0	123	165	34x3	34x3.5
Rassel......2000	1350	22.0	96	...	34x2.5	34x3
Sanford.....2000	1500	20.0	88	144	36x3	36x3
Schmidt....2000	1375	20.0	96	144	36x2.5	38x2.5
Service.....2000	1350	30.0	114	174	38x3	38x3
Siebert.....2000	1900	30.0	120	...	36x3.5	36x3.5
Stegeman...2000	2250	30.0	130	...	34x3	36x4.5
Tractor. ...2000	1200	30.0	87	147	36x4	48x6
Utility......2000	2000	35.0	110	168	40x3	40x3
Van-L......2000	1650	30.0	118	144	36x3	40x3.5
Victor......2000	2100	30.0	120	...	34x3	34x4
Westman...2000	2000	30.0	105	168	36x4	36x5
Whitesides..2000	1500	40.0	118	...	x2.5	x2.5
Wilcox.... 2000	2300	30.0	117	204	36x3	36x3.5
Winkler....2000	2000	25.0	107	168	34x3	34x3

2001 to 3000 Pounds

Brandon**..2500	2300	45.0	108	162	36x3.5	36x3.5
Cortland... 2500	1750	22.0	96	...	34x3	34x3.5
Eclipse 2500	....	30.0	106	...	36x1.7	36x1.7
U S........2500	2250	25.0	118	180	34x3.5	36x4
Van-L 2500	1900	30.0	130	...	36x3.5	40x3.5
Bergdoll....2600	1500	25.6	115	...	34x3.5	34x3.5
Amer. Eagle3000	....	25.6	115	189	34x3.5	34x4
Autocar.....3000	....	18.0	97	...	34x3.5	34x4
Blair.......3000	3000	30.0	114	137	34x4	34x3D
Chase......3000	....	30.0	112	180	36x3	38x3.5
Cortland....3000	920	24.0	92	...	34x3.5	34x3.5
Decatur. . 3000	2500	30.0	129	...	34x3.5	34x4
Dorris......3000	....	30.6	138	...	34x3.5	36x3
Dynamic....3000	....	30.0	84	...	38x	38x
Garford.....3000	2800	40.0	120	206	36x4.5	36x4.5D
Grabowsky..3000	....	28.9	121	...	36x4	36x4
Hart-Kraft..3000	2500	30.0	127	186	34x3.5	36x5

Buyer's Guide to Commerc

Name and Capacity	Price	Horsepower	Wheelbase	Overall Length	Tires	
					Front	Rear
Hewitt.....3000	2100	17.0	160	186	36x3.5	36x4
Ideal.......3000	2200	35.0	124	186	36x3.5	36x4
Johnson....3000	2000	30.0	96	159	34x3.5	34x3.5
LeMoon....3000	2500	32.4	132	...	36x3.5	36x4
McIntyre ..3000	1600	31.2	119	187	34x3	34x3.5
Mack.......3000	2750	32.4	126	192	36x4	36x3D
Mais.......3000	....	30.0	119	191	36x3.5	36x3D
Oliver......3000	2200	20.0	133	...	36x	36x
Sampson....3000	....	25.0	110	163	32x4	32x5
Sandusky...3000	2400	30.0	106	180	40x3.5	40x3
Sternberg. .3000	2300	30.0	110	156	34x3.5	36x4.5
S & L......3000	2000	35.0	115	180	40x3	40x3.5
U S 3000	2250	22.0	120	...	34x3	36x3.5
Velie.......3000	3000	40.0	148	...	36x3	36x3.5D
Westman††.3000	2300	30.0	105	168	36x5	36x5
Wilcox.....3000	2500	30.0	117	204	36x3.5	36x4

3001 to 4000 Pounds

Alco........4000	2750	30.0	112	177	36x4	36x3D
American...4000	3000	45.0	132	204	36x4	36x5
Atlas.......4000	2800	40.0	144	210	34x4	34x4
Atterbury...4000	....	....	144	...	36x3.5	36x3.5D
Avery......4000	2500	45.0	140	...	....	x3.5D
Beaver.....4000	2650	28.0	112	168	36x4	36x4.5
Beck.......4000	1500	24.0	120	156	36x3.5	36x3.5D
Board......4000	....	35.0	130	198	36x4	36x3D
Buckeye. ..4000	2250	35.0	...	...	....	....
Cass...... 4000	2650	35.0	130	204	34x3.5	34x3.5D
Chase... ..4000	2200	30.0	120	180	36x3.5	38x4
DeDion.....4000	3750	14.0	130	167	32x4	36x3.5
Durable D'n4000	2500	....	120	...	36x4	36x3D
Garford.....4000	....	40.0	140	218	34x3.5	36x3D
G-M-C......4000	2750	25.0	142	243	34x4	36x3.5D
Gopher.....4000	2450	38.0	112	186	34x4	34x3D
Grabowsky..4000	....	28.0	121	...	36x4	36x3.5D
Gramm.....4000	2600	....	117	180	36x4	36x3D
Hart-Kraft..4000	2750	32.0	130	194	36x4	36x3D
Hewitt.....4000	2750	24.0	112	159	34x4	34x3.5D
Juno.......4000	2650	30.0	132	192	36x4	36x3D
Kelly......4000	....	30.0	136	...	36x4	36x5
Kisselkar...4000	2750	40.0	140	...	34x4	36x3.5D
Knox 4000	....	40.0	103	...	34x5	34x4D
Lambert....4000	....	....	...	...	36x3.5	36x4
Lauth-Jgens4000	2700	35.0	120	228	36x4	36x5
McIntyre...4000	2500	....	132	...	34x4	34x3.5D
Martin......4000	3000	28.9	138	...	36x4	40x5
Modern.....4000	2600	35.0	118	198	36x4	36x5
Morgan.. ...4000	3000	27.0	113	162	34x4	35x4
Packard....4000	3000	26.0	120	202	34x3.5	34x4D
Packers.....4000	2500	30.0	130	...	36x3.5	36x5
Panhard 4000	3600	18.0	120	...	36x4.5	36x4.5
Rassel... ...4000	2400	....	120	...	36x4	36x5
Seitz.... ...4000	2800	40.0	118	192	34x4	34x2.5D
Stegeman...4000	2950	....	140	...	34x4	36x3D
Sternberg...4000	....	35.0	116	172	34x4	36x5
S & S......4000	....	36.0	125	...	32x4	34x5
Victor......4000	2900	40.0	140	...	36x4	36x3D
Walter.....4000	3000	30.0	124	...	36x3.5	36x5 or 6

4001 to 6000 Pounds

Blair.......5000	3250	35.0	121	144	36x3.5	36x4
Hart-Kraft..5000	3000	40.0	140	216	34x4	38x3.5D
Hewitt.....5000	2750	24.0	136	198	34x3.5	34x4
Mais.......5000	....	30.0	132	218	36x4	36x3.5D
Atterbury .6000	....	....	154	74	36x4	36x4
Avery......6000	3200	45.0	140	188	x5	x4D
Barker.....6000	3200	40.0	150	222	36x3.5	36x4D
Blacker.....6000	3300	40.0	120	101	36x5	36x3.5D
Board......6000	....	45.0	144	168	36x5	36x4D
B-O-E......6000	3000	40.0	138	216	36x5	36x3.5D
Champion....6000	3000	45.0	124	168	36x4	36x5
Commer....6000	5000	45.0	132	216	34x4	34x4
Durable D'n6000	3500	25.0	136	...	36x5	36x4D
Frontenac...6000	3500	45.0	123	205	36x5	36x4.5D
Garford.....6000	3400	50.0	120	...	36x5	40x4D
Grabowsky..6000	....	30.0	145	...	36x5	40x4D

able light. To be specific, a car which has been rated previously at 2000 pounds will be revised by the statement that it is designed for a 3000-pound load and consequently should be sold at that capacity, etc. Such a claim does little to attract the buyer, who either will consider this an exaggeration made in order to induce him to buy, and will then think that all favorable statements made previously have been altered similarly or will think that he actually wants a vehicle of the smaller capacity and consequently this one must be too large and too expensive for him to maintain, having been designed for the greater capacity which the salesman mentions.

Name and Capacity	Price	Horsepower	Wheelbase	Overall Length	Tires	
					Front	Rear
Gramm.....6000	3500	40.0	124	205	36x5	36x4D
Hart-Kraft..6000	3400	40.0	148	240	34x5	38x4D
Hewitt.....6000	3000	24.0	136	195	34x5	34x4D
Johnson....6000	2500	40.0	108	172	36x4	36x4
Jonz.......6000	3500	32.0	130	...	36x4	36x5
Juno.......6000	3250	45.0	142	222	36x5	36x4D
Kato**.....6000	3500	36.0	120	186	34x5	34x5
Kelly.......6000	....	30.0	136	204	36x4	38x4D
Kisselkar...6000	3350	50.0	144	232	36x4	36x4D
Knox.......6000	....	40.0	149	...	36x5	36x5D
Kopp.......6000	....	50.0	116	186	36x5	36x4D
Lambert....6000	3000	50.0	138	...	36x4	36x6
Lauth-Jgns 6000	3200	45.0	120	228	38x5	38x4D
Lord Balt...6000	3250	32.0	114	...	34x4	36x4D
McIntyre...6000	3200	40.0	140	...	34x4	34x4
Mack.......6000	4000	48.4	129	204	36x5	36x4D
Martin......6000	3500	28.9	138	...	36x4	40x3.5
Moeller.....6000	3500	32.3	124	180	36x5	36x4D
Morgan.....6000	3500	34.0	127	198	34x5	34x4D
Packard....6000	3400	32.0	144	237	34x4	36x4D
Peerless.....6000	....	....	151	...	36x4	40x4D
Philadelphia6000	3400	30.0	110	...	36x2.5	42x3
Pope Hartfd6000	3250	40.0	126	188	36x5	36x4D
Rassel......6000	3400	....	140	...	36x5	36x4
Sampson....6000	....	33.0	140	206	34x4	36x4D
Schacht.....6000	2900	45.0	144	218	36x4	36x4D
Schleicher....6000	4000	45.0	...	216	34x	34x
Seitz.......6000	3500	45.0	124	204	36x5	36x3.5D
Stegeman ..6000	3500	....	150	...	36x4	38x4D
S & L......6000	3000	45.0	135	216	40x4	40x5
Universal ..6000	3000	30.0	132	192	36x5	36x4D
Utility......6000	2000	45.0	136	216	42x5	42x5
Velie.... ...6000	3500	40.0	148	252	36x5	40x5D
Victor......6000	3450	50.0	146	...	36x6	36x4D
Walter.....6000	3400	30.0	124	...	36x4	42x4
White......6000	3700	30.0	144	236	36x5	40x4D
Wilcox.....6000	3000	30.0	126	234	36x4	36x3.5D
Winkler....6000	4000	45.0	120	240	36x5	36x3.5D

6001 to 8000 Pounds

Alco........7000	3650	36.0	126	211	36x5	36x4D
G-M-C Reliance....7000	3500	40.0	138	220	36x5	36x4D
Hewitt.. ...7000	3500	40.0	...	198	34x3.2	34x4
Knickerb'er.7000	3500	35.0	116	192	36x5	36x4D
Packers. ...7000	3400	50.0	150	...	36x5	36x5D
Walter.. ...7000	....	30.0	154	...	36x5	42x5D
Commer ...8000	5500	30.0	132	240	34x4.7	34x4.7D
Eclipse.....8000	....	45.0	144	...	36x5	36x4D
Knox.......8000	4000	40.0	149	..	36x6	36x6D
Longest.....8000	3500	40.0	...	...	x4	x4
Mack.......8000	4250	48.4	126	...	36x5	34x4.5
Peerless.....8000	....	....	151	...	36x5	42x5D
Saurer......8000	5000	30.0	153	236	36x5	42x5D
Speedwell...8000	3500	40.0	115	224	36x5	36x5

hicles for 1912 Concluded

The latter thought is certain to lose him as a buyer, while the former is almost as sure to throw the sale to some other car being considered at the same time. This practise of overrating cars for the sake of making a sale is one which the younger and less experienced salesmen are very liable to make without considering the natural rebound. Moreover, it is one which manufacturers would do well to advise all agents and dealers to avoid with great care.

There are a number of other similar points which the buyers would do well to look into with exceeding care as, for instance, the matter of adequate tires.

Name and Capacity		Price	Horsepower	Wheelbase	Overall Length	Tires	
						Front	Rear
Stegeman..	8000	3950	....	155	...	36x5	40x5D
Sternberg..	8000	3500	50.0	150	216	36x	36x D

8001 to 10,000 Pounds

Hewitt.....	9000	4000	40.0	...	222	34x5	....
Alco.......	10000	4750	40.0	144	235	36x6	42x5D
American...	10000	4500	60.0	130	...	36x7	36x5D
Barker....	10000	3700	40.0	150	...	36x4	36x4D
DeDion....	10000	5500	35.0	150	250	36x5	38x5D
Gaggenau.	10000	5250	30.0	162	228	33x3.9	36x4.7D
Garford....	10000	4500	30.0	...	...	36x6	36x6D
G-M-C......	10000	4400	40.0	138	220	36x6	36x5D
Grab'sky...	10000	....	44.1	156	...	38x6	40x4D
Gramm....	10000	4500	....	130	205	36x5	40x5D
Hewitt....	10000	5000	40.0	138	228	34x4	36x5D
Johnson...	10000	3200	50.0	132	204	36x5	36x3.5D
Kissel-Kar.	10000	4350	50.0	156	...	36x5	40x6D
Knickerb'r.	10000	4500	40.0	122	204	36x6	36x6D
Knox......	10000	4500	48.0	149	...	36x6	40x6D
Kopp......	10000	....	60.0	126	204	36x6	36x5D
Locomobile	10000	....	45.0	140	...	40x6	40x6D
Lozier....	10000	4800	35.0	134	199	36x5	40x5D
Mack.....	10000	4800	48.0	144	230	36x6	36x5D
Mais......	10000	....	38.0	154	262	36x	42x
Moeller....	10000	4500	32.3	138	228	36x5	36x5D
Morgan..	10000	4750	40.0	144	222	36x6	35x5D
Peerless....	10000	....	....	174	...	38x6	42x6D
Pierce-A'w.	10000	4500	38.0	156	...	36x5	40x6D
Rassel.....	10000	4400	....	140	...	40x6	40x5
Remington	10000	5000	38.0	162	246	36x5	36x5D
Sampson ...	10000	....	40.0	155	242	36x6	36x6D
Schleicher..	10000	5000	40.0	156	228	34x5	38x5D
Stearns....	10000	3800	44.1	144	...	36x6	38x5D
Victor.....	10000	4500	60.0	146	...	36x5	42x5D
Walter....	10000	....	40.0	154	...	....	.....

Over 10,000 Pounds

Commer...	11000	6500	40.0	144	264	34x5.5	40x5.5D
Hewitt....	11000	4500	40.0	138	222	36x4	36x5
Hewitt....	11000	4500	40.0	...	234	40x5	40x6
B-O-E.....	12000	6000	44.1	154	226	36x6	40x6D
Gaggenau..	12000	6000	45.0	178	252	33x4.7	37x5.5D
Knox......	12000	5000	48.0	149	...	36x7	42x7D
Speedwell..	12000	4500	40.0	139	260	36x5.5	36x5.5D
Stegeman..	12000	4000	45.0	156	...	36x6	40x5D
Alco. ...	13000	5200	40.0	164	235	36x7	42x6D
Commer. ..	13000	6500	40.0	144	264	34x5.5	40x5.5D
Aries......	14000	6000	40.0	156	270	36x5.5	40x8St
Hewitt....	14000	5500	40.0	138	240	36x5D	36x6D
Mack......	14000	....	48.2	129	...	36x7	42x6
Victor.....	14000	5500	60.0	146	...	36x7	42x6D
Remington	15000	5500	38.0	162	246	36x5	36x5D
Hewitt....	20000	6000	40.0	138	240	36x5D	44x7D
Moore.....	20000	....	45.0	135	246	42x6	42x6D

Name and Capacity		Price	Horsepower	Wheelbase	Overall Length	Tires	
						Front	Rear
Remington	20000	6000	38.0	162	246	36x5	36x5D
Victor......	20000	6500	75.0	158	...	36x7	44x7D

Municipal Sight-Seeing and Special Forms

Beck 18 Passenger.		3000	40.0	130	192	36x3.5	36x4
Franklin 5 Pass.....		2850	18.0	122	...	30x4	30x4
Gt. Eagle Ambul'ce.		3500	50.0	135	...	36x4.5	36x4.5
Gt. Eagle Ambul'ce.		4250	60.0	138	...	36x4.5	36x4.5
Knox Comb. Hose.		9000	60.0	170	...	40x5	40x5D
Knox Chem.-Hose..		5600	48.0	145	...	40x4	40x3.5D
Luitwieler Pump...		9000	60.0	139	175	x4	x5
Victor 15 Passenger		2750	30.0	120	...	34x3	34x4
Victor 20 Passenger		3500	40.0	140	...	36x4	36x3D
Victor 24 Passenger		3750	50.0	140	...	36x4	36x3D
Victor 30 Passenger		4000	50.0	140	...	36x4	36x3.5D

Gasoline Electric-Driven Vehicles

Couple-Gr..	10000	5600	45.0	144	222	36x4D	36x4D
Gt. West'n.	20000	....	....	172	302	48x12	48x12

Electric Motor Vehicles

Name and Capacity		Price	Battery	Wheelbase	Tires	
					Front	Rear
Commercial.	500	1800	.....	85.0	36x2.5	36x2.5
Urban......	600	1800	Lead	86.0	34x2.5	34x2.5
Waverley....	600	1800	Lead	87.0	32x2.5	32x2.5
Gen. Vehicle	700	....	Lead	74.0	32x2.5	32x2.5
Wash'ton..	750	1675	....	86	30x2.5	30x2.5
Studebaker..	800	....	Lead	84.0	36x2.5	32x2.5
Ward.......	800	....	Lead	.....	30x2	30x2
Argo.......	1000	1800	Lead	86.0	34x3	34x3
Baker......	1000	1900	Lead	85.0	34x3	34x3
Beaver.....	1000	2850	Ed'n	91.0	36x3.5	36x3.5
Commercial.	1000	2000	.....	90.0	36x2.5	36x3
Fritchle	1000	2000	.....	96	34x3.5	36x3.5
Detroit.....	1000	1300	Ed'n	80.0	32x2.5	34x3
Gen. Vehicle	1000	....	Lead	81.5	26x2.5	36x2.5
Studebaker..	1000	....	Lead	91.0	36x3	42x3
Urban......	1000	2200	Ed'n	86.0	36x2.5	36x2.5
Waverley...	1000	2280	Ed'n	87.0	32x2.5	32x2.5
Waverley...	1200	2250	Lead	97.5	32x3	36x3
Wash'g'n .	1500	2000	.....	90	32x3	32x3
Argo.......	2000	2200	Lead	96.0	34x3.5	34x3.5
Baker......	2000	2300	Lead	92.0	34x3.5	34x3.5
Commercial.	2000	2550	.....	100.0	36x3.5	36x4
Detroit.....	2000	1400	Ed'n	84.0	32x3	34x3.5
Gen. Vehicle	2000	....	Lead	102.0	36x3.5	36x3.5
Lansden....	2000	....	Ed'n	.....	....	....
Waverley...	2000	2910	Ed'n	97.5	32x3	26x3
Waverley...	2000	2400	Lead	97.5	32x3.5	36x3.5
Studebaker..	2500	....	Lead	104.0	36x4	32x4
Wash'g'n ..	2500	2300	....	96	32x3.5	32x3.5
Waverley...	2500	3060	Ed'n	97.5	36x3.5	36x3.5
Detroit.....	3000	1650	Ed'n	96.0	34x3.5	36x4
Lansden....	3000	....	Edin	.....	....	....
Walker**...	3000	....	Lead	.....	Optional	
Baker......	4000	3200	Lead	120.0	36x5	36x3.5D
Commercial.	4000	3000	Lead	116.0	Optional	
Gen Vehicle	4000	....	Lead	.....	36x4	36x2.5D
Lansden....	4000	....	Ed'n	.....	Optional	
Studebaker..	4000	....	Lead	117.0	36x5	36x3.5D
Wash'g'n ..	4000	2900	....	112	34x5	34x5
Lansden....	5000	....	Ed'n	.....	Optional	
Lansden....	6000	....	Ed'n	.....	Optional	
American...	7000	....	Lead	133.0	36x5	36x4D
Commercial.	7000	4200	Lead	.....	36x3.5D	36x3.5
Gen. Vehicle	7000	....	Lead	126.0	36x6	36x3.5
Studebaker..	7000	....	Lead	127.0	36x5	36x4D
Com'cial**..	10000	4650	Lead	132.0	35x4D	36x4D
Couple-Gr**	10000	5000	Lead	96.0	36x4D	36x4D
Gen. Vehicle	10000	....	Lead	139.0	36x7	36x5D
Studebaker..	10000	....	Lead	126.0	36x7	36x4D

The Electric Commercial Car In Boston

What Boston has done and is doing to forward the cause of the commercial vehicle, and particularly the electric, in and around the city, with mention of the attitude of dealers and agents, the co-operation between those concerned, the associations which are lending a helping hand and the aid derived from the central stations. Statistics of the cars owned and operated in the city and state.

Where the Detroit Electric commercial cars are sold on Boylston street.

BOSTON, which for a long time was called The Hub of the country, occupies a similarly prominent position in the electric car industry, its large number of commercial vehicles with that form of power and the prominence given to the battery-propelled car throughout the New England states having brought it to a leading position a long time ago, a place which it has never lost, although other cities may outdo it in actual total number of vehicles in use.

The causes which lead up to this result are not many, but the evident logic of each is such that the electric vehicle will continue to occupy a leading place in Greater Boston, while its strength may be expected to increase outside of the city with time, that is increase not as the ratio in other parts of the country but in proportion to the city's lead.

A glance at the map shown on the opposite page, although intended for another purpose as will be explained later, will show at once one of the advantages of the electric in Boston and one which never will be changed nor lost. By this reference is had to the topography of the city, with its narrow, crooked streets in the business district, the innumerable alleys and cross ways which make all of the blocks short, the large number of trolley tracks and the many different streets in which they operate, the location, size and layout of the freight terminals and the present small number of vehicles in use.

The advantages of these various points lie in the superior starting torque of the electric which allows of its starting from rest much more quickly than any other form, its shorter length which takes up a much smaller portion of the street, its generally shorter wheelbase which gives it a shorter turning radius and superior maneuvering ability and its lighter weight and slower speed which permit of stopping more quickly and upon shorter notice. Moreover the combinations of these points make for further advantages, as, for instance, shorter wheelbase with quicker starting and easier maneuvering allow of turning out around traffic ahead which blocks the way and thus proceeding through the crowded and crooked portion of the city with greater rapidity as compared with a car which occupies more space and consequently could not thread its way through traffic, or which has a longer wheelbase and consequently could not be driven through the narrow spaces and around obstructions as easily, and the slower starting power which would prevent taking advantage of an opening on one side of the street while the other was blocked.

How the Shorter Length of Electrics Enters

These points might be elaborated upon at great length, but a few figures will suffice to prove the point. The average of all two-ton gasoline trucks on the market is 191 inches overall and 124 inch wheelbase. Similarly for 3.5 ton sizes, the figures are 216 and 133 respectively. For electric vehicles in these two sizes, the dimensions become 166 and 111, and 183 and 126 respectively. On the smaller car this shows a saving of 25 inches in overall and 13 in wheelbase, while the larger unit economizes to the extent of 33 on the body and but seven on the wheelbase. Translated into actual street dimensions, a block 192 feet long would accommodate 12 gasoline cars and 14 electrics of two tons capacity, and one 108 feet long, 11 and 13 of the two types but of 3.5 tons capacity. The former means that in a short block of downtown Boston, the majority of which are less than 200 feet in length, two more cars could be accommodated between any two cross streets, or the amount of traffic increased 16.6 per cent. with the smaller size and 18.2 per cent. for the larger, both in favor of electrics as compared with other forms.

This economy applied to the entire length of a single street, as, for instance, in the 40 blocks of Washington street between Haymarket square and Dover street, would add 80 vehicles of either two or 3.5 tons carrying capacity, or from 160 to 280 tons of merchandise each load. On a very conservative basis of five loads a day, this would give to the business men of that city, through a single thoroughfare, between 800 and 1400 tons of freight a day. This totals between a quarter and a half million tons a year. Added to this economy of street space, of fundamental importance in a city like Boston, where the small width of pavements, many turns due to crooked streets, and innumerable intersections of cross

Service Station of the Detroit Electric Sales Agents, Located on Columbus avenue, but a Short Distance from the Salesroom on Boylston street, Illustrated on the Opposite Page. The Garage Includes Charging and All Other Necessary Facilities

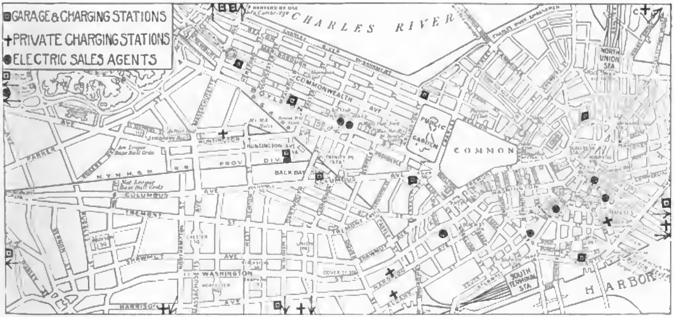
streets forming additional blockades at very short intervals make a peculiar situation and one which is difficult to deal with, is the matter of turning and maneuvering. The cars mentioned above have, in the two-ton class, wheelbases of 111 and 124 inches and for the 3.5 ton carriers, 126 and 133 inches respectively. It will be apparent at once how much better the former will handle under the conditions of congestion than will the latter. These items more than overbalance for city work the additional speed of the gasoline form.

Aside from these topographical advantages for the electric commercial vehicle in Boston, there remains the greatest of all, early introduction and years of publicity work with its cumulative effect. In 1897, F. N. Phelps, now selling the Baker electric commercial line, sold to Cobb, Aldridge & Co., wholesale grocers now at 220 State and 728 Washington streets, the first vehicle ot this type in the city, it being a Columbia electric then manufactured by the Pope company. Shortly after the second of the same make was sold to J. G. & B. S. Ferguson.

The Electric Boom and Its Collapse

During that year (1897) the electric commercial vehicle enjoyed a great boom in Boston and much publicity was given to this form of car as a solution of all the merchant's problems and a sure money saver and profit maker. These early cars were well enough equipped insofar as battery and motor were concerned, although neither would compare with similar units of today. The trouble with them, however, lay in the faulty design, for instance, on the first two cars mentioned and most of those sold during 1897 and 1898, two motors were used to drive the rear wheels directly by means of spur gears. There was no provision for maintaining the alignment of the rear axle and the relative center to center distance of the driving gears, and, as the electric units were large and powerful, trouble soon ensued.

The driving torque of the motors would soon push the gears out of mesh, bend the axles on which the wheels were journaled out of line and generally muss up the whole rear construction. As the gear center distances were reduced gradually, the motor had to do more and



Map of a Portion of Boston Showing the Distribution of Sales Agents for Electric Commercial Cars, Also Public and Private Charging Stations

ELECTRIC COMMERCIAL CARS IN

Boston			78
Cambridge	25		
Dorchester	5		
Brookline	3		
	33	Greater Boston	111
Lawrence	11		
Lowell	5		
Malden	5		
Lynn	4		
Salem	4		
Springfield	4		
New Bedford	4		
Everett	3		
Campello	2		

more work to propel the vehicle, until they were separated, when no movement of the wheels would result. This put the cars out of commission, until the axle could be straightened and the gears thus brought back into mesh. As repair facilities were poor and the stock of parts on hand almost negligible, each repetition of this occurrence put the car out of commission from one to four days. Obviously, the merchant could not stand this kind of service for any length of time, while the exposed nature of the gears caused them to wear out very quickly, in fact, the whole construction was unusually severe on tires and other parts. As a result, the electric commercial car boom of the early days, if it might be termed that, collapsed.

For several years following this, to use an expression of the street, "there was nothing doing" with electric cars of any kind in and around Boston, and, as a result, throughout New England. But by careful painstaking work many of the early bad impressions were removed, this being easier, as it was proven that the cars were designed and constructed on much better lines and with superior materials. Moreover, the manufacturers had learned their lesson and began to stand back of their product, selling service instead of cars. Boston's superb park system, many boulevards and excellent paved streets outside of the small downtown circle of congestion and crookedness began to influence slowly but surely the influx of the electric pleas-

Some of the Boston Electric Commercial Salesrooms. Top, Where the Baker Representative Holds Forth; Middle, Hupp-Yeats Salesrooms; Bottom, Waverley Salesroom and Garage

ASSACHUSETTS, FEB. 23rd, 1912

helsea	2
ast Hampton	2
Vorcester	2
llston	1
lolyoke	1
lilford	1
antasket Beach	1
o. Hadley Falls	1
ewton	1
oxbury	1
N. Warren	1
Revere	1
lethuen	1
Beverly	1
	59

Total Massachusetts . 170

ure car. This steady growth had its influence upon the strictly business wagon, and it, too, began to pick up.

To-day it is more firmly established than ever, the city has better facilities for using it and making it serve the merchants, while the number and variety of sales agents for this form is far and away what it has ever been before. There are now 13 electric car agents in Boston, of which eight handle commercials, six of the latter being engaged in this work exclusively. The whole number of garages and charging stations where batteries may be recharged is 13 in Boston proper and 24 in Greater Boston, so-called. This includes only the public places, in addition to which there are more than 10 private charging stations connected with the stables or garages of firms utilizing this form of vehicle. The map on a previous page shows the general location of all these, space alone preventing the use of the complete layout of Greater Boston. All told, the state boasts of more than 120 charging stations, which number is being extended continuously through the publicity and other efforts of the city group engaged in pushing the electric car.

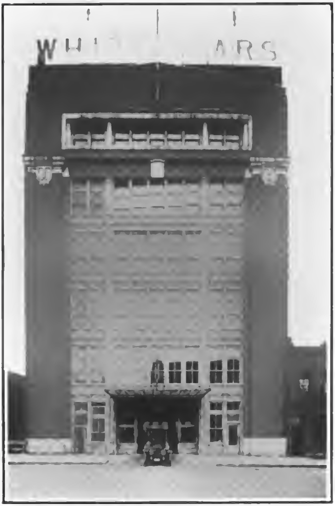
It is mainly to this group that the present situation is due, for they have preached the gospel of electricity early and often, have spent much money in disseminating information favorable to it, have urged business men and others to investigate it and in other ways have worked for the cause early and late.

Some of the Greater Boston Charging Stations for Electric Commercial Cars. Top, Waverley Garage in Cambridge; Middle, Massachusetts Automobile Club; Bottom, Regent Garage at Cambridge.

COMMERCIAL VEHICLE MANUFACTURERS IN NEW ENGLAND, 1912

State	Gasoline	Electric	Steam	Total
Massachusetts	8	1	1	10
Connecticut	5	0	0	5
Rhode Island	2	0	0	2
	15	1	1	17

Cooperation is very much to be desired, particularly where it can be effected without destroying individual power and initiative. In this respect the Boston situation is almost ideal. Aside from concerted action along advertising and publicity lines, several associations have contributed, while the general attitude is toward united effort. This will result in large sales during the season of 1912, together with many reorders from present owners, who are bound to add to their cars when assured of the additional service and facilities which will be theirs.



White Garage on Newbury Street, Where Vehicle May Be Stored or Batteries Recharged

COMMERCIAL VEHICLES IN NEW ENGLAND, 1912

State.	Actual Registration to Feb. 15th.	Estimated Converted Pleasure Cars.	Total All Kinds.
Massachusetts	1,383	462	1,845
Maine	35	20	55
Connecticut	23*	15	48
New Hampshire	10*	12	22
Rhode Island	8*	12	20
Vermont	4*	10	14
	1,463	531	2,004

*Registration does not segregate commercials from pleasure cars. Figures represent count of known commercials among registered cars plus 20 per cent to cover possible omissions.

The associations which are serviceable in this endeavor to boost the electric in Boston are the Electric Vehicle Club, which meets every Wednesday at noon in the Edison Electric Illuminating Company building on Boylston street; the Electric Vehicle Association of America, Boston branch, which meets once a month regularly and oftener for special purposes; the Boston Commercial Motor Vehicle Association, Inc., a large number of the influential members and officers of which are electric men; the Boston Automobile Dealers Association; the New England Street Railway Club and the New England Telephone and Telegraph Association, the members of which are deeply interested in anything electrical or closely allied to their work. Although these seem somewhat diversified, the general tendency to boost the electric car and commercials in particular has a beneficial result, and the many ramifications bring more buyers into line than would be possible otherwise.

The Edison Electric Illuminating Company, beginning about a year ago has taken the greatest interest, done the most work and spent the largest amount of money, despite the fact that it has no vehicles or accessories to sell and can hope to profit only through the possible use of a public charging station which it furnishes with current. In this work it has gone into the subject deeply, taking for its slogan "In 15 years more electricity will be sold for electric vehicles than for light."

In addition to this work the company has appropriated a large sum of money to investigate traffic conditions the country over, with the idea of securing accurate data upon which to base conclusions as to the best field for horses, gasoline and electric cars. This work is being done under the supervision of H. M. Thomson, research assistant at the Massachusetts Institute of Technology.

Feeling the need for a better and more extensive garage and charging station in the downtown portion of the city, as was brought out by the garage committee of the E. V. A. of America, this company established such a station at 476 Atlantic avenue, this being operated under the supervision of the committee just mentioned. At this, the following rates are in force, although the customer may pay garage and current charges separately:

RATES AT ATLANTIC AVE. ELECTRIC GARAGE.

Runabout	$35 a month
700-pound wagon	37 a month
1000-pound wagon	40 a month
2000-pound wagon	45 a month
3000-pound wagon	50 a month
2-ton truck	55 a month
3-ton truck	60 a month
3½-ton truck	60 a month
4-ton truck	65 a month
5 ton truck	70 a month

In the latter case, the initial rate is seven cents a kilowatt-hour, which may be reduced by taking a large amount of charging only at set times under special conditions. Current is sold to garages throughout the Metropolitan district at a much lower rate but the average charge is not far from this figure. Under special conditions, these places give a lower rate also. The Edison downtown garage will be described in a later issue.

Individually, the dealers are looking forward to the best year ever, the newcomers in the commercial line being especially hopeful. A number of these were interviewed, all of them in fact, and with a single exception they predicted the largest number of electric delivery wagons and trucks sold in Boston and vicinity this year for both long and short hauls.

How Chicago's Coal Supply Is Handled

Details of the Downtown Delivery of Fuel in the Windy City, Showing the Enormous Handicaps Against Which the Commercial Vehicle Must Contend, These Being Imposed by Old Methods, Building Owners, City Regulations, Architects' Practice and Topography of the City

OF ALL the cities of the country none emphasizes more the handicaps against which the motor truck builder must contend in the introduction of his product than Chicago. Taking a single branch of the city's transportation activities, that of coal handling, it will be shown that this presents at present a situation which makes it impossible for power vehicles to compete with horses and win out on the basis of economy and efficiency. Moreover, it will be proven that the coal man, while in a receptive mood toward the up-to-date method of handling his product, is fully aware of these handicaps and will not purchase until they can be removed so that his investment will be a paying one.

Salient Points in the Chicago Coal Situation

When downtown buildings are fitted with proper receiving facilities, the coal dealers of Chicago will adopt motor trucks exclusively.

A truck costing $5,000 must do more than just twice the work of a $1,000 horse outfit to justify the original outlay.

The majority of office buildings in Chicago lack alley coal dumping facilities, which cost their owners millions each year, because a city ordinance taxes such openings heavily and requires a large bond for their use.

Until some steps are taken toward changing the alley conditions, the best proposition is the sidewalk dump, a makeshift and a great obstruction to pedestrians.

Night deliveries of coal failed because of extra cost, lack of co-operation by building owners and theatre traffic.

All of Chicago's school coal, 80,000 tons a year, must be shoveled by hand at a yearly loss of $8,000 for shoveling alone, because delivery openings are five feet above the ground.

An average coal delivery from motor truck dumping body with the prevailing small openings is 13-14 minutes. With a proper sized hole, this could be cut in half.

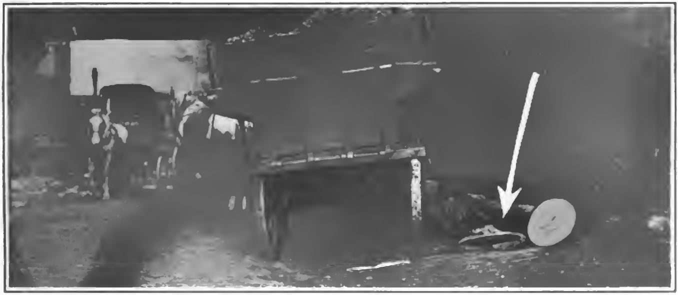
Commercial vehicle coal delivery at schools is made more costly by the necessity for the use of school scales, widely separated and located at but a few of the buildings, necessitating double trips. Nearly all of these, too, are too small for motor trucks.

A comparison of unloading times with the illustrations shows that the receiving facilities determine the length of time and consequently the number of trips made each day.

The day is coming when the motor truck will be adopted in the coal business and every other line of city transportation and will stop the biggest waste in modern civilization.

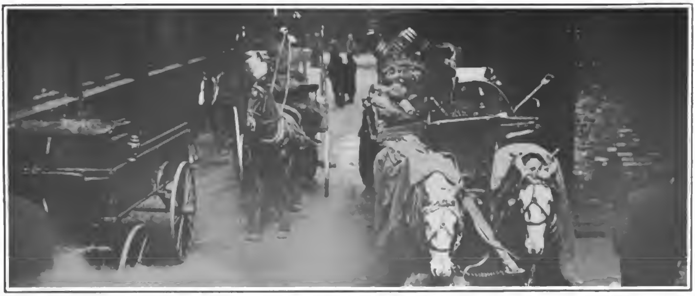
"When the downtown buildings of Chicago are fitted with proper receiving facilities for coal delivery from dumping bodies the coal dealers of Chicago will adopt motor trucks almost exclusively for the local work. The use of a truck for the house-to-house delivery of coal is entirely impracticable under present conditions, but there is a large sphere of usefulness for the truck downtown when doors are properly fitted in the alleys or sidewalks so that it need not take but a few minutes to get rid of a load." This statement was made recently by M. E. Robinson, vice-president of the City Fuel Company, of Chicago, a firm at present using from 400 to 500 teams in its delivery service, and having just completed a test with several types of motor trucks.

In these tests the trucks in every case have made good, the connected loading and unloading systems have been a failure and hence have hindered the truck from really competing with horses even for downtown work. A study of recent figures on a test shows that more time, however, was lost in the coal



The Influence of Small Coal Holes Upon Truck Efficiency

Alley scene at the rear of Rothschild and Company's department store, Chicago. Here a two-foot hole must eventually take the entire load. A good proportion of the coal, however, first finds its way to the alley pavement and must later be reshoveled into the vault. . A hole of adequate size and a modern dump truck would save much time over the antiquated unloading method here shown



How the Presence of Other, Slower Vehicles Holds the Truck Back

Congested traffic conditions in the alley in the rear of the Siegel, Cooper & Co. store. The coal wagon on the right is largely responsible for this congestion. In this instance, 67 minutes were required for the unloading of the coal with a shovel. A motor coal truck would have bottled up the driveway for a much shorter period

yard than in delivery. On speaking of this, however, it was quickly explained that these were conditions under the jurisdiction of the City Fuel Company, adequate at present for horse systems, but which would be changed immediately when the adoption of motor delivery finally was determined to be a feasible proposition. So far the firm is not convinced as to the practicability of a motor truck with the peculiar demands the work makes upon it.

Figures from Two Competitive Tests

In a certain test with a six-ton non-dumping truck the City company brought out some interesting figures showing actual comparisons of service between horse and motor, as in the following list, each trip being made from the yards at 25th street and Cottage Grove avenue, and the average run being about 1.5 miles:

MOTOR TRUCK.

Trip 1 to	Van Buren and La Salle
Trip 2 to	New York Life building
Trip 3 to	36 South Franklin
Trip 4 to	Van Buren and Clark
Trip 5 to	1700 State
Trip 6 to	New York Life building

These trips were made by a vehicle representing an investment of $5,000. On the same day from the same yard a two-horse team, valued at less than $1,000, made four trips as follows:

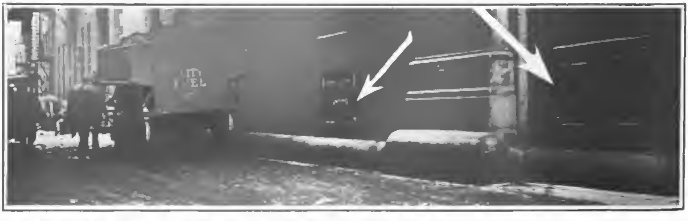
HORSE DELIVERY.

Trip 1 to	New York Life building
Trip 2 to	719 O'Brien street
Trip 3 to	160 Fifth avenue, North
Trip 4 to	Madison and State

Thus, the $5,000 investment made but two trips more a day than the $1,000 investment, and it easily can be seen, showed a loss rather than a gain, except insofar as greater reliability of service is concerned. An average of 25 minutes was consumed at the yards for loading and 21 minutes in unloading.

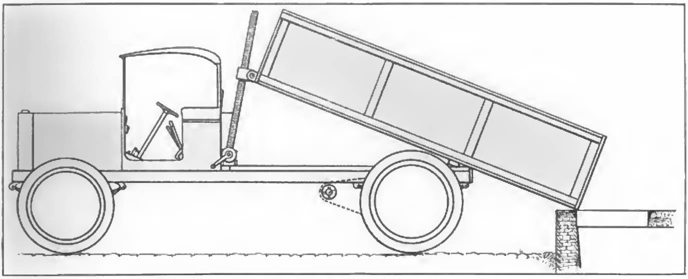
Trucks Are Loaded Quickly With a Derrick

Loading at the City company's yards is accomplished by means of a steam derrick and power scoop with which, after the truck is once backed into position, the load can be put on inside of six minutes. The trouble at the loading end, therefore, is in the congestion of teams awaiting their turn during rush hours. At the unloading end, however, the troubles are due to a number of reasons.



Where the Architect and Builder Unconsciously Hampered the Truck

Coal doors in alley walls of McCormick building. Dump bodies cannot be used here. Six to seven loads of coal a day are delivered through these doors in winter, three a day in summer. A local ordinance requires owners to pay heavy rent to city when using space under alley for coal storage purposes



Municipal Authorities Must Be Enlightened on Manhole Positions

How the high curb interferes with the dump body angle. If the curb were lower, the time which the driver takes in assisting the last of the load out of the body would be saved, since the sliding angle would be greater

Most of the newer buildings have their coal storage vaults under the alleys or sidewalks with a door above. In the case of alleys this door is arranged so that a wagon can drive directly over it, thus, in the case of a dump-body truck, easily discharging the load in a few minutes without the aid of any shoveling. One of these cases is that shown back of Mandel Brothers' store in Chicago. This condition also obtains at the New York Life building and the Railway Exchange building where dump-body coal trucks are often unloaded within seven minutes and the truck is away again in 10.

High Curb Calls for Hand Shoveling

The other cases are where the coal hole is in the sidewalk and while this is a great help, yet the height from the curb to the sidewalk is a hindrance, preventing the truck from dumping at its greatest angle, so that as a rule a shovel must be used to help the last of the load to slide. In both cases coal holes are usually too small to allow opening the whole tail-gate and thus let the coal flow out in a mass. The ordinary size seems to be about two feet square or a two-foot circle, as is shown in several of the illustrations. With this arrangement only the small door in the tail-gate can be opened so that the coal comes out slowly, thus taking more time from the service of the motor vehicle which, were the receiving conditions right, might make several more deliveries during the day, and thus a better showing over horse systems.

Architects Unconsciously Restrain Motor Trucks

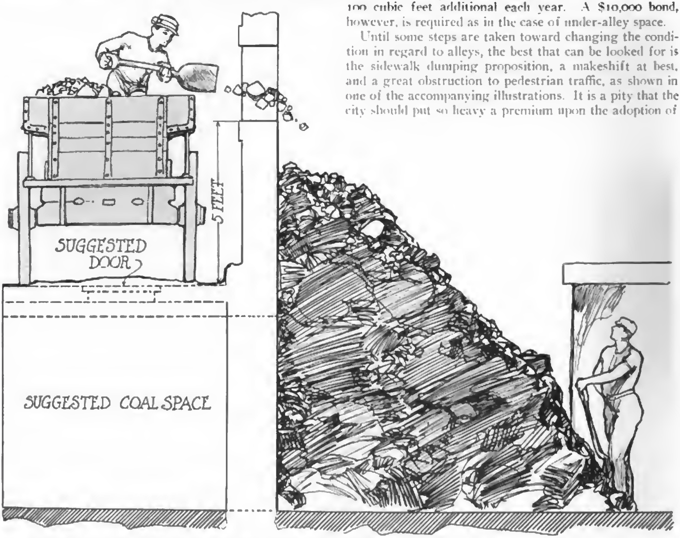
This is but one condition in Chicago which hinders the use of motor vehicles in coal delivery, and when one sees such a fine modern building as the McCormick building on Michigan avenue putting the coal doors in the side of the building off of the alley, instead of arranging

How Improper Coal Hole Location Obstructs Pedestrians

Rear unloading into a two-foot hole in front of the Majestic Hotel. The sidewalk was narrowed by four feet at this point for more than an hour The motor truck would have discharged its load and the sidewalk would have been cleared in one-third of the time. From the amount of coal spilled, the opening into the bin is seen to be much too small for space under the alley allowing the use of a dump body, one looks for a further reason than merely ignorance on the part of the architect or builder.

Originally, space under adjoining alleys was used for this purpose, but as the city grew an ordinance was passed which now compels a payment to the city of a certain amount in each case for the privilege of using this space. The alleys above, however, must be surfaced and kept in repair by the adjoining owners.

The charge for this space in the alleys is based on the full assessed valuation of the adjoining property, it being computed from one-tenth of the valuation, four per cent of which is the charge for the first 15 feet of depth. 50 per cent. of this charge extra is required for every additional 12 feet or fraction below the first 15 feet. At the same time the firm building the vault under the alley must furnish to the city a $10,000 bond against any accident, through defective construction or other cause, which may occur at that point.



How Chicago Taxpayers Are Prevented from Having the Truck Savings

80,000 tons of coal are delivered to Chicago schools in this manner, making successful motor delivery impossible until conditions are changed. If coal could be dumped in a door, as shown dotted, motor trucks would do all this work at less cost

Municipal Charges for Alley Chutes

If one merely puts in a chute leading from the alley into a coal storage space off the alley line below, charge is made for the space the chute occupies, this amounting to $15 to $25 a year. The Federal Life building, which is north of Randolph street pays but $10 a year for the space of three chutes. This method, however, generally necessitates a man below when the coal is dumped in to spread it and keep it from piling up and stopping the chute.

Cost of Space Under Sidewalks

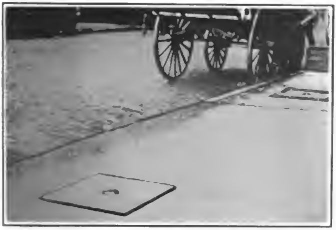
Space under the sidewalks formerly was charged for in the same manner, until the ordinance was repealed and a new fee basis substituted. The present rate for the permit fee is $5 for the first 4000 cubic feet and $1 a 100 cubic feet additional each year. A $10,000 bond, however, is required as in the case of under-alley space.

Until some steps are taken toward changing the condition in regard to alleys, the best that can be looked for is the sidewalk dumping proposition, a makeshift at best, and a great obstruction to pedestrian traffic, as shown in one of the accompanying illustrations. It is a pity that the city should put so heavy a premium upon the adoption of a modern method of coal handling, and yet this seems to be at present a matter of ignorance of conditions. Though striving to relieve congestion in the loop district of Chicago the matter of coal delivery has been overlooked almost entirely, although it is a rare thing to look into a Chicago downtown alley without seeing in it somewhere a coal wagon unloading, this taking anywhere from 30 minutes to 1.5 hours, and often tying up the alley during the unloading period.

It was suggested some time ago that coal deliveries in the loop district be made at night, and for a while this was tried but with little success. The reasons for this, according to the City company, were primarily that not all of the buildings had a night engineer, but banked their fires for a certain period, while there was the extra congestion of theater crowds during certain periods to hinder the running. The cost of delivery at night was also more than during the day, which might have been the main reason for its being dropped. During cold snaps and slippery weather several hundred tons have been delivered at night of late where the horses have been hindered so much by weather and road surface conditions during the day that they could not work to full capacity.

School Arrangements Cost Taxpayers $10,000 a Year

Eighty thousand tons of coal are delivered to the public schools of Chicago every year, this of necessity being shoveled out by hand through windows several feet from the ground. No condition permits the use of a dump-body truck so that, for the delivery of this 80,000 tons, horses are the only paying proposition available at present. Photographs are reproduced of the receiving windows of one of the Chicago schools and a diagram of the second one visited explaining this point. If the five-foot wall, shown in the diagram, were cut down, nearly half of the bin of coal could be put in through the window by means of a dump body and chute, but under present conditions all must be shoveled by hand. A few hundred dollars spent in changing the coal vaults of the schools would save a great deal of money each year, the shoveling alone costing $8,000, to say nothing of the loss of time to the team which must stand during the unloading process. With this loss of time a motor truck would be impossible as a paying proposition.

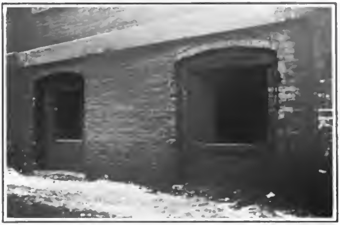


Proper Manhole Sizes Are of Great Importance

A Chicago instance of the limitation of motor truck economy, efficiency and sometimes, use, by the small-sized coal holes through which all of the downtown supply must be delivered. These are but 20 inches square and far from the curb

One Example of Quick Truck Delivery

To show what a dump body actually can do in comparison with shovel unloading the City Fuel Company made a six-ton delivery to the Karpen building on January 11, using its demonstrating motor truck and a 5.5-ton load by horse vehicle at the same time and under the same conditions. The coal doors were in the sidewalk and ample in size to receive the full capacity of the dump-body stream. It took this machine two minutes to back into place on an icy street, whereas it took the three-horse team an even 10 minutes. Seven minutes were used in discharging the load of the dump-body truck while it took 27 minutes to shovel off the load from the horse wagon. In all the motor truck occupied but 14 minutes from the time of its arrival to its leaving, while the horse machine took 37 minutes for practically the same work.



Picture of a School Showing Size of Coal Holes

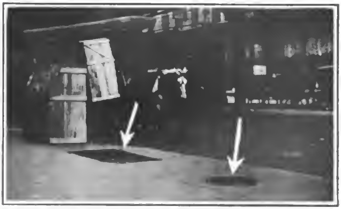
An example of the unloading facilities of the Chicago public schools. The dump truck would be of very little service under such conditions, and gravity chute discharge would be but little better since the openings are raised two feet or more from the ground. For the truck to pay conditions such as these must be improved

What this Big Saving Represents

The 23 minutes saved in unloading would mean but a loss of a mile in road service for the horse vehicle, while with the motor truck it would mean a gain of three miles. In fact it was but a few minutes after the horse vehicle had left when the motor truck passed the same spot again fully loaded and headed downtown, having made a two-mile trip besides loading.

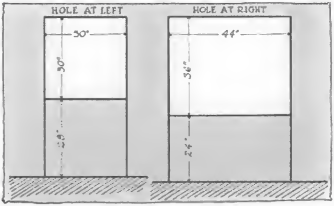
Another instance of the advantage of quick unloading, and pointing toward another consideration which should be had in mind when designing coal receiving facilities is the case of a recent delivery of coal to the New York Life building by the Pierce truck demonstrating for the City Fuel Company.

This arrived at 12:14, driving through an alley entrance so narrow that the body cleared by a bare 10 inches on either side as it went through, causing a delay of one minute in entering and two minutes in backing out afterwards.



More Small Sized Manholes Presenting Difficulties

A typical example of the unloading facilities with which the modern motor truck with dump body has to cope. The round hole in the foreground measures 21 inches in diameter, while the square one is 27 inches by 36 inches. For best service with the rear discharge dump truck the sidewalk opening should measure at least 36 inches by 60 inches or an equivalent area



Actual Dimensions of a School's Coal Holes

Dimensions of openings shown previously. These were designed for hand shoveling from the wagons. Time would be saved by cutting out the closed portion from the ground to the opening (28 inches and 24 inches high, so as to permit of a sharper angle for chute unloading.

The coal was what is called No. 4, a fine buckwheat just damp enough so that its free flow was slightly impeded. It took three minutes to raise the body, the tail-gate being opened at 12:16 before the body was fully up.

The receiving door, as stated before, was in the floor of the alley so that after the truck drove over it to the proper location all there was to do was to open the door and tail-gate and dump the load. The former, however, was not as wide as the truck body behind so that with the tail-gate open a considerable amount of coal spilled on the alley instead of going into the hole.

In seven minutes the load was off, slightly assisted at the last by the shovel of the helper. After this it took the same helper four minutes to shovel the spilled coal around the door into the hole, but the truck started away again in 14 minutes from the time of its entry.

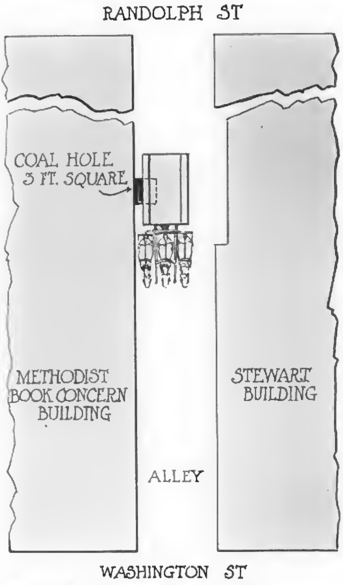
An opposite condition was encountered by another make of truck in use by the same firm in making a delivery at the McCormick building on Michigan avenue. The receiving doors for coal at this building are in the side of the alley wall, as in the accompanying photographic reproduction.

This truck arrived with a full six-ton load, the body being a non-dumper, but with hoppers on the side out of which the coal was scooped by two men at a surprising rate. The day was extremely cold and a wind sweeping down the alley from the very North Pole finally so chilled the machine that the motor stopped, nor could the driver, after several benumbed attempts, get the motor started again. Running the water out of the radiator he waited for the repair man. The water ran over the alley, crossing at a point where many pedestrians were passing and, freezing, became the cause of a number of accidents, the driver making no attempt to sand the icy spot until a number had slipped and several had fallen. It was over an hour before the repairman got to the spot and started the motor without trouble. The driver problem is undoubtedly an important one if this case of carelessness is average. The coal was gotten off the truck, however, in about 13 minutes of actual working time.

Specifications for school coal delivery demand a special kind of service. In the first place all deliveries must be made between 8 in the morning and 5 at night, the coal being entirely unloaded before the latter-named hour. All coal delivered must be reweighed on one of the school scales and not all are fitted with weighing appliances. On Saturdays coal is received until noon except pay day, which is generally, but not always, the first Saturday of the month, necessitating the coal company keeping track of pay day if it does not wish to make useless delivery trips. Starting to deliver coal at one school the driver must proceed to another school, where the coal is weighed, after which he drives back to the place of delivery, where he must arrive early enough to have his load entirely discharged before 5 in the afternoon.

Coal scales are made in two sizes, known as short and long, the short being but 12 feet long and not large enough for a motor truck, while the long ones are 22 feet from end to end. The latter, however, are seldom as accurate and cost more to keep up. Practically all of the downtown scales are short and hence cannot accommodate the ordinary motor truck.

There is probably no city in the country so ill-fitted

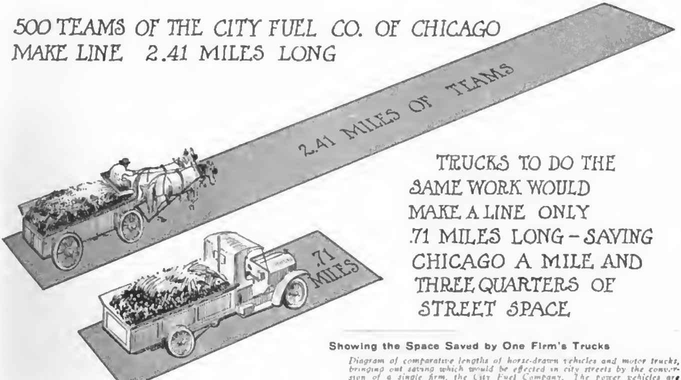


Narrow Alleys in Chicago Have Big Influence

Showing how an alley was blocked for one hour and eight minutes by a three-horse coal wagon. A truck would have dumped its load and departed in less than 25 minutes, thus saving more than 43 minutes to traffic, to say nothing of the time gained by the coal dealer.

for the use of trucks in coal delivery as Chicago, not only on account of the conditions named, but also because hauls are short, averaging about 1.5 miles, since railway spurs run so close to the heart of the city. This fact hinders other lines of truck work besides coal delivery. The fact of the haul being so short makes the loading and unloading time of double importance.

Taking into account these adverse conditions and the fact as well that the test was made during the coldest week in January when the weather was below zero nearly every day, streets covered with ice and snow, and conditions altogether very severe, the showing made by a Pierce-Arrow five-ton dump-body truck in a service test is truly remarkable. Within a period of seven days, under the most adverse conditions, over 355 tons of coal were delivered at an average cost a ton of 24.6 cents, 342.9 miles being covered, an average of 48.9 a day.


500 TEAMS OF THE CITY FUEL CO. OF CHICAGO MAKE LINE 2.41 MILES LONG
2.41 MILES OF TEAMS
.71 MILES
TRUCKS TO DO THE SAME WORK WOULD MAKE A LINE ONLY .71 MILES LONG - SAVING CHICAGO A MILE AND THREE QUARTERS OF STREET SPACE

Showing the Space Saved by One Firm's Trucks

Diagram of comparative lengths of horse-drawn vehicles and motor trucks, bringing out saving which would be effected in city streets by the conversion of a single firm, the City Fuel Company. The power vehicles are figured to do the work of 500 teams now employed

The greatest tonnage delivered in one day was 78.5, a mileage on the same day of 74.4 being registered on the odometer. The extra weight carried and distance traveled on this day were due primarily to the breakdown of the horse system, the temperature being 12 degrees below zero and the streets a sheet of ice.

Deliveries were mostly within the loop district where congestion is greatest, the alleys narrow and the facilities for coal-receiving but average. It is interesting to note that the dump body, when conditions were right, was able to unload in 10 minutes. By comparing the unloading times in the following tables with the illustrations one can see in the receiving facilities a cause for the time taken in leaving the load, although in some cases the delays were due to causes other than too small a coal hole.

In connection with the coal business the driver problem seems to have an especial bearing. In some lines of work the old drivers have been educated to handle the motor truck with good success, but the City Fuel Company seems to question whether this would be the same in its case. It has been necessary so far to have an extra man on the motor wagon to handle the coal, since the average motor-truck driver considers himself a little above the handling of so dirty a product. A man who drives horses is perfectly willing to use a shovel, but when this same man learns to drive a motor truck he is likely to consider himself a skilled mechanic and hence must have another man along to do the dirty work. One of the reasons why the coal companies are holding back on the adoption of trucks is the fear that they will stir up a labor problem as did the street car companies when they attempted to change the gripman of the cable lines to drivers of electric cars. Feeling themselves a higher class of men there was a great deal of trouble and financial loss due to the attitude and to misunderstandings during the formative period of the electric car industry. If the coal men are to meet this same condition they first must study the cost. Once again we reach the conclusion that the truck itself as a machine is only a unit in the revolution of transportation methods which is to come and the missionary to teach the gospel of efficiency which will bring these things to pass. The greatest changes of the future will be in systems and not in trucks, fitting business and transportation methods to vehicle service and speeding up to meet the new conditions, rather than trying to fit the truck to each and every business, a thing absolutely impossible. We think with respect of the amount it will require to supplant the draft horses of the present day with motor systems, but were we to figure the money which will be spent before our traffic and transportation methods and appliances are made to fit the truck we would be astounded at its amount. Yet the day is coming, and coming soon, when not only in the coal business but in every other line of city transportation, the motor truck will be adopted, and with it a system which will

(Concluded on Page 50)

Wagons and Horses For Sale

What Becomes of the Horses and Wagons?

Showing by Specific Figures from All Over the Country, No Loss Need Be Sustained In Motor Truck Adoption

Part II—In Other Cities

THE first installment in the February issue laid down the principles upon which horses are replaced and showed in a broad way that few actual substitutions of one for the other are found, the general scheme being to extend the business not by adding from two to 50 horses according to the size of the business but by putting in from one to nine or 10 trucks. These have so much higher efficiency and work at such a greater speed that a reorganization of the transportation methods generally follows.

It is in this manner that the commercial vehicle replaces the horse and wagon, the latter being continued on one of the outer ends of the delivery work rather than as a main artery, so to speak. So, since the horse is not actually disposed of and his place taken by a motor truck, there is no monetary loss. It is the case generally that when this change is made the animal has reached the end of his efficient life anyhow, so that any further life and service is so much velvet. This being the case, moving him out onto easier work with the power vehicle doing the hard, heavy work is a simple matter of kindness, although sentiment has no place in business.

IN Indianapolis, the situation is not so very different. There, for instance, the city has two one-cylinder trucks bought for the engineering corps. The three horse-drawn vehicles were continued, simply extending the number of parties sent out. It is quite likely, however, that the horse-drawn equipment will now be displaced with new motor trucks to be purchased. It has been found that the actual cost of operating one of the trucks a month since last March has been $12.50 and this has included oil, gasoline and all repairs. Solid tires are used. It costs the city $20 a month to feed a horse.

About three years ago the Adams Express Company displaced all of its horse-drawn equipment in this city with about 20 electric trucks. In this instance the horse-drawn equipment was shipped to agencies in smaller cities and towns in the vicinity.

Until the present winter, the horse market in Indianapolis has been strong and there has been no difficulty in disposing of horses in many instances at a price larger than originally paid for the animals. Just at this time, however, the horse market is at a standstill because the hay and grain crop in the state was practically a failure last year and horse feed is at the highest in 20 years.

The large amount of building construction and public improvement work in the city ordinarily causes a steady demand for horses that can be used for teaming. During the summer months $4.50 a day is paid for teams, and there is usually a scarcity of them at that figure.

Second hand horse-drawn delivery wagons as a rule are sold to two concerns in this city that make a specialty of buying them and reselling after painting and repairing the vehicles. The price paid is from 25 to 30 per cent. of the original selling figure. After these are painted and worked over, they readily are sold to small grocers, laundries, butchers and teamsters.

The Indianapolis board of school commissioners has just installed a Mais truck to deliver supplies to the 63 district and two high school buildings and the board is now asking bids for the three horses and two wagons formerly used in this work.

The police department is now completely equipped with motor emergency and patrol equipment and in this instance the horses used were transferred to other city departments while the patrol wagons were sold at about 25 per cent. of the original purchase price.

IN Newark, which is within the Metropolitan area so-called, the layout is such as to offer little attraction for commercial vehicle use, hence the changes made have been with the idea of getting everything possible out of the old and new service. In other words, the purchase has been nursed along until opportunity presented itself to strike the best possible bargain in the disposition of both horses and wagons.

A notable exception to the rule is the case of W. F. Cummings, who conducts a trucking business. Not more than two years ago he had 16 horses. To-day he has two—and three huge trucks. The remaining two steeds are used in city work, the machines out of town. When he sold the 14, he asserts, some of them went for as low as $75 and $100. But he takes the view of other Newarkers, which is explained later.

There are various reasons which, probably, contribute to the situation in the community on the Passaic river. Chief among them, perhaps, is the extent of the suburban territory. When the average Newark merchant buys a truck, instead of putting it in to do duty for his horse or horses, he goes after the out-of-town field and keeps his four-footed helper for local use purely.

The municipality's thoroughfares and the general conformity of the city, which a City Plan commission has been appointed to look over with an eye to improvement, are not conducive to the extensive employment of the commercial vehicle solely within its limits.

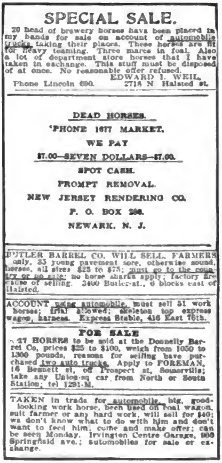
Among the largest firms which operate commercial vehicles to a considerable extent are two breweries—the Lion and Christian Feigenspan, Inc., and the New Jersey Ice Cream Company. The machines owned by each are devoted entirely to routes in the county outside the city limits. In the case of each the city department was able to take over those horses and trucks which had hitherto been used in the suburbs.

It is conceded by the three concerns that, had it been necessary to sell them, no inconsiderable item would have been placed, so far as formal accounting is concerned, in the ledger column devoted to loss. As it is, it is declared a question whether, despite an extreme depreciation, any actual loss in dollars and cents would have been sustained. For it is contended that whatever apparent loss might have been encountered because of the necessity to sell at a figure far below the original cost, the triply-more-efficient service of the trucks and the increased business derived therefrom would have more than balanced the discrepancy. This is the view, it seems, that is general among Newark users of the commercial vehicle, and with this opinion it is that Mr. Cummings coincides.

THE horse brings a good price in Chicago providing that he is in good condition. The average will range from $200 to $250. Those bought at the figures given will, if given good care, bring about $200 to $230 on the market when sold. The average loss sustained by forced sale appears to be about 25 per cent. which cannot be considered a debit in those cases where the animal has given long service so that his original price has been written off in the form of depreciation.

An instance comes to hand of a case in Iowa. A farmer there bought a single-cylinder Cadillac for hauling butter, eggs, etc. The sorrel mare which cost $150 four years previous was sold for $200, a profit of $50. The wagon, on the other hand, cost $150 and brought but $40. so the whole transaction showed a loss.

IN Delaware, particularly Wilmington, although the truck users do not figure any loss, enough horses have been sold to lower the price which can be obtained for a second-hand animal. M. Megary & Son Co., owner and operator of the largest furniture store in Delaware, which operates a large number of teams, has replaced two double teams and two wagons with a motor truck, which does the same work. Of these four useless horses the three, which together cost $600, were sold for $235. Leo Montgomery, an officer of the company, said all of the horses had been in the company's service for a long time, and considering that fact he thought the result of the sale was satisfactory. The fourth horse is unsold. The company has not sold any of its wagons and does not know whether there is a demand for second-hand vehicles.



SPECIAL SALE.

20 head of brewery horses have been placed in my hands for sale on account of automobile trucks taking their places. These horses are fit for heavy teaming. Three mares in foal. Also a lot of department store horses that I have taken in exchange. This stuff must be disposed of at once. No reasonable offer refused.
EDWARD I. WEIL,
Phone Lincoln 690. 2718 N Halsted st.

DEAD HORSES.
'PHONE 1677 MARKET.
WE PAY
$7.00—SEVEN DOLLARS—$7.00.
SPOT CASH.
PROMPT REMOVAL.
NEW JERSEY RENDERING CO.
P. O. BOX 266.
NEWARK, N. J.

BUTLER BARREL CO. WILL SELL, FARMERS only, 35 young pavement sore, otherwise sound, horses, all sizes $25 to $75; must go to the country or no sale; no horse sharks apply; factory fire cause of selling. 3400 Butler-st., 6 blocks east of Halsted.

ACCOUNT using automobile, must sell 31 work horses; trial allowed; skeleton top express wagon, harness. Express Stable, 416 East 76th.

FOR SALE

27 HORSES to be sold at the Donnelly Barrel Co, prices $25 to $100, weigh from 1050 to 1300 pounds, reasons for selling have purchased two auto trucks. Apply to FOREMAN, 16 Bennett st, off Prospect st, Somerville; take any Union-sq car from North or South Station; tel 1291-M.

TAKEN in trade for automobile, big, good-looking work horse, been used on coal wagon, suit farmer or any hard work, will sell for $40; we don't know what to do with him and don't want to feed him, come and make offer; can be seen Monday. Irvington Centre Garage, 800 Springfield ave.; automobiles for sale or exchange.

Newspaper Clippings of Ads, Showing Where Some of the City Horses Go

The Delaware Hardware Company, wholesale and retail hardware dealers, has installed a truck that does the work of three single horse and one double team, and also obviates the necessity for a great deal of contract hauling, which had to be done with equipment hired for special delivery service. Of the horses replaced the company has sold two, which cost $300 each, for $162 each, which an officer of the company said was satisfactory, as the horses had been used a long time and one of them would have been forced out of the service shortly anyway. The company has not sold any wagons and does not know whether there is a market for them.

The Wilson Steamboat Line, which operates a freight and passenger service between Wilmington and Philadelphia, has four trucks—two electric and two gasoline—which, with the addition of three more commercial electrics ordered, are expected to do the work of 22 horses. The company recently had all of its animals burned in a stable fire and since that time has hired the horses necessary for delivery work. Joseph Wilson, an officer of the company, in discussing the sale of those forced out of service by the motor truck, said his company had not had the experience, because of the fire, but as it had been a buyer of horses for many years he had found that there was always a good demand for draft horses, even now, with the truck in the field, and he was of the opinion that no actual loss would be sustained here in disposing of good horses. The company has not sold any of its wagons and has not made any effort to do so.

From what could be learned through other sources it appears as if there is a fairly good demand, on the part of smaller dealers, for second hand horses and wagons and that they command fair prices here. Nobody could be found who could estimate the proportion of loss, if any, to the original owner. No figures could be obtained that would give any adequate idea of the relative value of new and old wagons, for the reason that the old ones are not often forced on the market and the buyer usually gets them because he goes after them and makes his bid.

AN anomalous condition presents itself in Detroit, which is peculiar to that city, for not only have concerns that installed trucks in place of horses been able to dispose of the latter without loss, but in a majority of cases they have netted a comfortable profit on the transaction. In the local market horses to-day are worth five per cent. more than they were a year ago, 10 per cent. more than 1910, and the demand for good animals is at all times strong. Medium heavy truck horses bring from $250 to $275 apiece, the heavier grade from $300 to $350, and concerns with horses in sound condition that they had in commission for two years or longer have experienced no difficulty in disposing of them at the original cost, if there has not been a small margin of profit on the transaction. The same is true of light delivery horses, although here it has sometimes been the case that, having practically outlived their usefulness in the field where they were subjected to such hard usage, they went to rag pickers and second hand dealers at a fraction of their original cost, the price paid depending upon who drove the bargain. Depreciation in value of trucks and wagons is more difficult to determine because of the attitude assumed toward vehicles.

We don't count the wagons as much of an item in computing what it cost us to make the change, said the transportation manager of a large grocery house which displaced 12 double wagons and 30 horses with six motor trucks. We had our money back two or three times on the cost of the wagons, so whatever we received for them when they were discarded was in reality so much velvet. Offhand, I should say that we got anywhere from 10 to 25 per cent. of their original cost for the wagons we sold, mostly to second hand dealers. We were glad to get rid of them at that price. With the horses it was different, and there was a good demand for them at top notch prices.

But don't forget that in estimating the relative cost of the two systems you must count in the difference in what they can accomplish. We start a two-horse team every morning for Grosse Pointe, 10 miles from the stables, or nine miles from the store. At one in the afternoon we dispatch a truck over the same route with just as heavy a load—43 minutes is its actual running time to the end of the line—and the truck will be back to the barns at night long before the wagon that left a half day earlier.

The Detroit Taxicab & Transfer Co. recently installed 10 two-ton trucks that are equivalent to 20 of the old style trucks and 50 horses, it being figured in all cases where horses are used extensively that for every double team an extra horse must be held in reserve for relief work and emergencies.

We disposed of all the horses we cared to sell without suffering any loss, said the manager of the company. In spite of the great number of motor trucks that are coming into use, taking the place of horses, there are not enough of the latter to supply the demand, and the price is advancing right along. Either the farmers are not raising horses any more or the country is growing too fast, and the demands are increasing out of all proportions.

We sold what new trucks we let go at considerably less than cost, but we had been using them for a long time, so there was really very little if any loss there, aside from natural depreciation that must be marked off each year.

MANY different opinions and methods of attacking this proposition are encountered in Ohio. The D. Kelly Company, corner Front and Naghten streets, Columbus, changed its five wagons for two motor trucks about two years ago. This is a wholesale grocery concern and has a large trade in Columbus and immediate vicinity. As D. Kelly, owner of the company, owned a large farm about 20 miles southeast of the city, he immediately sent the five wagons and 10 horses there, where they proved to be excellent farm teams. The horses, used to the city streets, revived considerably when placed on the farm and will be capable of much longer service there than in the city on the hard, paved streets. While no exact inventory of the horses and wagons was made it was presumed that they brought almost their full value when changed from the grocery business to the farm account.

The Scioto Valley Supply Company, Long and Third streets, one of the largest supply houses in the city, changed its delivery system to motor trucks in 1909, using two large Packard three-ton trucks in the place of five wagons, of which four were two-horse wagons and one a single horse wagon. The horses, nine in number, had been purchased from a horse raiser in Indiana and were of excellent breeding. They had been used but four or five years and the owner of the stock farm was willing to purchase them back at almost what was paid for them. The horses were mostly young and their full value was received in that way. The wagons were sold to local transfer people and expressmen. They were disposed of at a sacrifice, but advertising in the local papers was the means of securing purchasers for the wagons, which were generally in good condition.

S. Wolf & Son, commission merchants, 135 South Fourth street, have taken up the motor truck idea for delivery service, and installed one truck, which has taken the place of two horse-drawn wagons. The company expects to supersede the other wagons, six in number, with automobiles, and then the problem of disposing of the horses and wagons will come up. The company still has the horses and wagons which have been taken out of service.

The Pure Milk Company, a large jobbing and retail milk concern on East Town street, has placed four motor trucks in service which have superseded a number of horse-drawn vehicles. The company had no trouble in disposing of its horses to transfer and express companies in the city at the average rate of $150 a head. The horses were fairly young, usually, and in good condition, so the price was only a fair one in the open market. The company had more difficulty in getting rid of its wagons. There was little demand for such second-hand materials and the bodies were taken from the running gears and sold. The latter are still on hand. The milk company expects to place a number of other motor trucks in service.

The Columbus Transfer Company, which is beginning to substitute motor trucks for horse-drawn wagons in its freight work, is not making the change sufficiently fast to have any great number of horses or wagons on the market. The plan of the company is to change only about as fast as the present equipment wears out and to have the wagons ready for the junk pile when they are discarded.

The Busy Bee Candy Kitchen Company, which has a number of stores in Columbus, the main office being located at Gay and High streets, has displaced about five of its 18 horse-drawn wagons with three-ton trucks. The service up to the present time is satisfactory in every respect. The company disposed of some of the older and broken-down horses to scavengers. Those sold were the ones that would have had to be sold even if horse-drawn wagons were retained. The wagons were sold to wagon makers for about $40 each, only a fair price. These wagons will be rebuilt and sold as delivery wagons.

THE Baltimore Police Department furnishes a good idea of what becomes of horses and wagons with the introduction into service of the motor car. Eight Locomobile patrols are now in service, while there is one inspection wagon—also a Locomobile—used by Marshal Farnan and Deputy Marshal Manning for inspection work. These nine cars have superseded as many horse-drawn patrols, three Black Marias or jail vans, and an inspection wagon, together with 18 horses for the patrols, six horses for the jail vans and one for the inspection wagon. The average price of each horse ranged from $300 to $350 new, while they sold for from $100 to $110 each. In most cases they were sold at auction and popular buyers were owners of cabs or hacks, while some of the animals went out of the city. The wagons were bought new for something in the neighborhood of $400, while they sold around $75 to $100. In most cases after being purchased from the police department the buyers put new tops on the vehicles and converted them into huckster wagons and the like.

One of the largest wholesale bakers, which does a big business in the city and suburbs for some distance out, has adopted what may be styled the process of elimination. That is, the motor trucks or delivery wagons are placed on the most important routes. The horses and wagons formerly used thereon are put on less important routes, and so on down until the old or worn-out horses and oldest wagons are reached. These are the ones disposed of. Most of these horses make their way to the South or on farms in the state and bring an average price of $100 each. They cost when new from $250 to $300 each. This firm finds it cheaper to replace old wagon with new ones than to pay repair bills. New wagons cost about $250 to $320 each. They are overhauled twice, once every two years, making them serviceable for a total period of six years. In that way the wagons do not wear entirely out and the firm gets better second-hand prices, which range from $75 to $100 each. These wagons are generally purchased by smaller retail firms, while hucksters are good buyers. A few of them find their way to the country. The motor trucks placed in the service of this concern in each case have replaced a two-horse team, but the manager has found that the motor wagons cover from two to 2.5 times the territory that the horse-drawn vehicles did formerly, thus enabling the company to have a bigger scope of territory to work.

The Charles M. Stieff Piano Company finds that one five-ton White motor truck does the work of two double teams. When new trucks are installed the horses and wagons replaced are not sold, but are sent to branch stores which the firm conducts in various cities of the North, South and near West. The horses used for piano hauling cost something like from $300 to $400 new, while the wagons average around $400 and $500.

Commercial Car Tires and Accessories

IN the description of the truck tires and tire accessories shown at the New York displays, space prevented mention of all present. Those who were crowded out of the February issue will be found below:

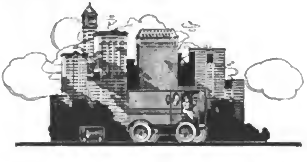
The Polack Tire Company, New York City, devoted a small space to the well-known metal base form of solid tire, now made in Jeannette, Pa. This has a thick steel base with serrated upper edge, to which the hard rubber is vulcanized by a special secret process. To this the softer tread material is united, the whole having a distinctive section for which it is claimed there is no loss. Retention is by means of a press fit, the tire being forced on the permanent wheel band by pressure. Some side lugs, four on each side, are used for safety's sake, but are considered unnecessary.

The biggest showing of Swinehart tires was made at the Palace, where a large majority of the larger trucks were thus equipped. This form has a series of holes or cells in the tread, not all at the same angle to the surface, which present large possibilities in the way of good traction and the prevention of slipping or skidding. In addition, the closing of these openings from below with the consequent entrapping of an air cushion in each forms a source of additional resiliency. The maker claims a much greater resiliency, while the lighter weight of the same sized tire is said to permit of higher speed without trouble or wear. This same form is supposed to produce longer life and freedom from cuts.

The Diamond exhibit consisted, besides the standard pneumatic and other forms, of the wire mesh base, in which a series of woven wires encircle the band. These are impregnated with rubber, that is to say, there is material all around them, above, below, between the meshes, etc. This is a semi-hard composition, above which is the usual tread rubber. The former, as constructed by this company, does away with the extra tire base of metal and lightens the construction by just that much. In section, the material is built up with somewhat straight sides and a very broad top, so that it resembles a rectangle more nearly than any other. Retention is by side flanges and through bolts, allowing of quick removal or application.

A prominent accessory in this line, of particular utility for taxicabs and lighter cars using pneumatic tires, is the Woodworth tread protector, shown by the Leather Tire Goods Company. This is a leather and fabric unit, shaped to fit around the tread portion of an air-filled tire, the surface being studded with tempered steel rivets. Since the vehicle runs on the latter, the life is correspondingly greater than if it ran on the leather directly or the usual rubber. Along the sides, a special steel spring tightening device is used to hold them in place, but is of such a nature as to permit easy application or quick removal.

Lyon grips are applied over solid tires, the shape being that of a U both from the side or end view. The ends of the side members have a series of holes, through which cross bolts hold the two parts together, and the whole in place on the wheel. The ends which cross the tire tread and form the gripping portion are broad and have thick edges so as to give a maximum grip with a minimum weight. Usually, the size is varied with the weight and size of wheel, but three are used for each member, set equidistant around the circumference, or as nearly so as the spokes will allow.



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The Big Shows and Business

NOW that three of the four big displays and several times as many of the smaller exhibitions have closed with reports of great interest and large attendances, much greater than last year, it seems a good time to stop and reckon the cost, or better yet, to ask and answer the question: Do truck shows pay?

This will be a difficult matter if the actual orders received at the exhibitions be counted and the profit from those set against the total expense, in fact it would not be out of the way to state that this would be unfair and unwise. Each show does much to bring people to the way of thinking that this is an automobile age and that the commercial car has arrived rather than that it is coming. These ideas, if carefully sown, bring fruit later on, very often from most unexpected quarters. So from that standpoint, the firm looking for large immediate results would be off the right track to count the show a poor one or the results not worth the effort.

Another view of the same matter lies within the composition of the company and its sales personnel, that is to say many of the older firms able to sell their entire product with little effort adopted the same methods with motor trucks and waited for business to come to them. Although it has been said that the demand for vehicles the coming season would exceed by far the production, it is doubtful if this will obtain to the extent of buyers voluntarily placing orders with manufacturers whose wares practically are unknown to them except by popular reputation of their pleasure cars. The firms which took this waiting attitude toward those in attendance—and much of it was noticed, particularly on the part of Eastern makers showing in Chicago—did very little, and were noticeable among those who complained of no results.

A feature which has done much to drive home the idea that the commercial car has arrived and as a business proposition, awaits the merchant's call, like the telephone or typewriter, was the absence of trucks or light vehicles which resembled in any way, shape or form pleasure cars. In the early days of the industry nearly all were so close to the touring form that, with the body off, it was difficult to tell which was which. Obviously, these commercial cars were such in name only and did not give service. Knowing this, the merchant today purposely avoids those forms which show too close a resemblance to his touring car or runabout.

Along this same line it should be said that buyers are becoming more shrewd in the matter of mechanical details, and that the maker who is trying to get by with a power vehicle otherwise all right, but containing his pleasure car motor or transmission or both, is going to get fooled badly. In the main, the method of the big firm has been, and is today, for the partner to go over the cars in the show and decide in a general way which ones please his eye as business-like machines. Then the engineer gets an order to go over all those on this preliminary list and investigate their mechanical details with reference to fitness for the company's work. A correct and specific report on this is followed by negotiations for a number of these cars.

Bearing this in mind, is it not impossible for anyone, no matter how well informed on the subject of shows, to say at the close of a motor truck display that it has been either a success or a failure? If the results of this method of investigation, which leads to the largest and most profitable orders, are not apparent at the close of the exhibition and for some time to come after that, how can it be stated whether the show was a success or not, since the inclusion of the business originated thereat whether closed the same month or the one following, would make the display successful or its omission a failure possibly?

When it is all summed up, about the only way in which the show can be judged with reference to its business getting qualities is the total year's business in a season when the firm did not exhibit and one in which it did, or perhaps by comparing a year in which only one big show was on the list as compared with that in which several or all were included. Even this method would not be perfect since the industry is increasing so rapidly that the results from a show two years ago would not compare with last year, nor either one with the present season. It is extremely difficult, if not impossible, to evaluate the presence of a well arranged display at any show. On the other hand, regardless of its valuation or result-bringing ability, absence would be equivalent to the admission that the firm did not wish to be considered among the country's best and foremost makers.

* * *

Standard Warranties for Trucks

Despite the fact that the National Association of Automobile Manufacturers evolved and adopted a standard warranty for pleasure vehicles, many years ago, all of its members and many non-members in the industry utilizing this freely, no similar guarantee of replacements has ever been evolved for commercial cars. Considering the present status of the motor truck branch of the industry, it seems high time that this oversight be remedied, for the sake of uniformity and standardization if for no other reason.

The bearing of this matter upon the present situation is that it permits makers to cut their selling price in certain cases, while apparently upholding the same. This underhanded method consists in an individual form of warranty in which extraordinary replacements are cared for, this being the equivalent of allowing the buyer unusual latitude in the operation of his cars, even beyond business prudence, since his guarantee covers these cases.

This departure hurts the maker doing it most in the long run, but for the present and immediate future it gives him an unfair selling argument and one which, perhaps, the design and workmanship in his vehicle would not warrant on a merit basis. For these and other reasons, the matter should be taken up as early as possible by the various manufacturers' associations and settled promptly by the adoption of an equable warranty.

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Co-operative Use of Commercial Vehicles

One thing which the builder of small sized vehicles has to contend with at this time is the fact that there are few small businesses which can afford to use and are willing to try a motor-driven delivery wagon. Take, for instance, a florist, butcher, baker, milliner. Despite the fact that a car of 1000 pounds capacity would be ideal for their deliveries, few of them have sufficient work to keep such a machine employed profitably, to say nothing of keeping it busy all day and every day.

The solution of the problem in these cases is the cooperative purchase of a car by two firms or perhaps two cars by three concerns, or in any other similar manner. By dividing the time into two or three parts, and each business taking one of these, it will be possible to keep the car busy during the entire day, and thus realize the fullest measure of economy and efficiency, even perhaps overtaxing the vehicle. There would be, of course, a number of small matters of detail to be considered in such an installation, but none which cannot be overcome by giving them thought.

At a recent meeting of the Retail Grocers' Association, of Dayton, O., this method of lowering grocery overhead costs was considered at some length and a system of delivery outlined. Although slow progress was made with this matter, it has not been dropped and is still alive.

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Insurance and the Motor Truck

It may come as a shock to many who have figured the insurance of a motor vehicle, used in delivery service, as negligible or so small as to be nearly so, to note that the actual cost of any sized truck in a certain state, when insured properly for fire, liability and collision, is nearer to $500 a year than to $400. This works out on a monthly basis to $40 or about $9.25 a week, which expense must be carried whether the vehicle works or not.

Of course, not all states charge as much, nor are conditions such as to require that amount of outlay, but the bare statement of fact is sufficient to emphasize the remark that not enough attention is given to this item and that, in the majority of cases, its importance is minimized. On a three-ton truck doing its 42 miles a day on the basis of seven miles a gallon of gasoline, the latter costing 11 cents a gallon, the total yearly fuel cost would be less than $190. From this it may be seen that the insurance in the state referred to would be nearly 2.5 times the fuel cost, and in almost any state would be equal to the latter. No wise manufacturer would neglect fuel or oil consumption, yet here is an item of equal cost and importance which is disregarded absolutely.

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Time, Money and the Truck

The Lackawanna Railroad has just finished spending $11,000,000 on its direct line to Buffalo in order to save 20 minutes on the running time. Incidentally, of course, there are many other large benefits to accrue, such as the elimination of grades, some troublesome curves and others, but the net expense figures out as above, or half a million a minute on each train.

Compare this attitude with that of the business man who will not adopt motor trucks in order to save several hours a day on all his goods, or, having adopted them, persists in working them along horse schedules or with methods of loading and unloading which are highly inefficient and waste much time. A recent investigation showed that it is possible for the commercial vehicle to save from 1.5 to two minutes in each block of heavy traffic by simply turning out around the obstruction. If a truck's ability in a small day's work be translated into blocks, this would equal about 400. Two minutes saved in each one of these totals four hours. There are cases in which a vehicle which is costing its owner in fixed charges approximately $1.60 an hour wastes 20 minutes waiting for access to a loading platform about eight times a day. Capitalized, this represents $4.32 a day, or $1300 a year. The latter sum is equal to six per cent. interest on $21,700 invested in better platforms.

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The Two Kinds of Truck Power

For a long time there has been a decided difference of opinion among commercial vehicle advocates as to the better form of power, gasoline or electric. Now, it seems as if this matter has settled itself, and slowly but surely it is coming to be realized that each type has its distinct field in which it shows marked superiority. If this ideal condition should ever come to pass, all of the best firms would build both kinds in all sizes so as to have a complete line and thus compete for any order.

Just recently the largest firm in the country, engaged in this form of work, added a complete line of electric vehicles to its previous group of gasoline cars, while within a few weeks, it was announced that the second largest firm had secured control of one of the electric companies for the purpose of rounding out its product. Several years ago, there were two or three large producers bringing out both kinds and cataloguing each, these having since dropped the electric because the other sold more readily. With the revival of interest in the battery-driven car, they doubtless will take that form up again. It is a question if this latest development will not prove to be one of the best things that has ever happened.

Late News of the Month

The Two Big Pittsburgh Truck Displays—Newark's Successful Show—Features of the Exhibitions at Brooklyn, Montreal, Atlanta, St. Louis, Baltimore, Ottawa and Elsewhere

PITTSBURGH, Feb. 19.—The city's biggest and best motor truck show opened in the immense Exposition building at the Point, Saturday night, Feb. 17th, under the auspices of the Pittsburgh Automobile Show Association, Inc. In skillful and costly preparations for the show, in the beauty and novelty of its decorations, in the number and variety of the exhibits and in the many attractive innovations, this second annual exhibition stands away ahead of any other automobile show ever held in the city. The association which put on its first show last year is composed of the most aggressive and successful automobile and motor truck men of the city. Thomas I. Cochran, who managed the first show last year, is a veteran in the automobile show business.

Fully 12,000 people attended the opening night and the Exposition building, which is much the largest auditorium in Pittsburgh, was brilliant with red, white and gold, the show colors.

The trucks were arranged on either side of the broad aisles on the first floor and also at both ends of the immense hall. The exhibits were noteworthy for two things. In the first place, the different agencies had a larger number of types of vehicles on exhibition than ever before. In the second, fully three-fourths of the trucks shown are in daily use by Pittsburgh firms and big wholesale concerns in western Pennsylvania. It was freely predicted the first night of the show that three times as many sales would be made as last year owing to the big crowd of prospective buyers and the intense interest they manifested.

Makes and types of cars never before seen in Pittsburgh were on exhibition. This is due strictly to the rapidly growing popularity of the motor truck as a delivery vehicle so that manufacturers and agents have decided to give their time and money to advertising their cars at this show. The management has advertised this exhibition largely as a truck show and the wisdom of this course is vindicated fully.

Several truck agencies have been established in Pittsburgh the past year. Among them are those of the International Motor Car Company, which is located temporarily at 111 Beatty street, East End, but will have big downtown headquarters after May first and the Aspinwall Auto and Garage Company, which has taken the agency for the Atterbury truck at Aspinwall on the North Side. The trucks manufactured by the newly organized Lange Motor Truck Company, of Pittsburgh,

Interior of the Exposition Building in Pittsburgh During the Recent Motor Truck and Automobile Show which has just bought a site for a big plant, were the center of attraction for local buyers. The Kelly truck of the West Penn Auto Company also made many friends.

The committee has sent out thousands of invitations to prospective buyers within a radius of 150 miles of Pittsburgh and special arrangements for receiving and entertaining them have been made. Truck manufacturers are united in declaring the arrangements as nearly complete as could be provided and anticipate some splendid sales this week.

The officers of the Pittsburgh Automobile Show Association, which is putting on the show, are as follows: E. A. Williams, president; E. Lange, vice-president; J. B. Howe, treasurer; A. A. Buhl, secretary, and T. I. Cochran, manager. B. F. Benson, J. H. McClarren, E. E. Gregg, L. G. Martin and J. D. White are directors.

Truck Week of Pittsburgh Dealers' Show

PITTSBURGH, Feb. 15.—The second week of the show put on at Duquesne Garden by the Pittsburgh Automobile Dealers' Association opened very auspiciously Saturday evening, Feb. third, devoted principally to the exhibit of motor vehicles. Interest in this line has increased tremendously during the past three years. Five years ago commercial trucks were almost an experiment in the Smoky City. Now there is hardly a big wholesale or manufacturing concern but has from one to a half dozen vehicles or is seriously considering their purchase. As a result the garden on Saturday night was crowded with representatives of prominent business firms who took a keen delight in viewing the different types of trucks on exhibit. Hundreds of letters had been sent out to big wholesale and manufacturing concerns from western Pennsylvania, eastern Ohio and West Virginia urging them to visit the show and see what has been done the past year in the development of these cheap delivery vehicles —cheap from the standpoint of cost comparison with horse deliveries.

The heavy trucks came in for a big share of attention. Brewing companies, hardware concerns and some of the department stores are already using mammoth delivery trucks. Types similar to those now familiar on Pittsburgh streets were seen at the garden and their structure was investigated very closely by prospective customers. The light delivery trucks, mostly of the electric vehicle type, were also popular with the visitors. They are driven by single motors and equipped with light and heavy duty batteries giving them mileage capacities of from 40 to 75 on a single charge. Of interest, too, was the larger inquiry from Tri-State territory for public safety vehicles, both for police and fire department. The Pittsburgh Department of Public Safety already has installed a number of motor-driven fire engines and is planning to buy more. Borough and town officials within a radius of 50 miles of Pittsburgh could be seen frequently among the visitors studying the best types and learning all they could about the uses and abuses of these vehicles. One of the interesting features of the show was the immense truck that was purchased last week by the Flannery Undertaking Company. This truck will carry in addition to a coffin 32 persons and is only one of the kind in use in Pennsylvania.

Country dealers report a much larger inquiry for trucks than ever before. Pittsburgh agencies declare that 1912 will be by far the best year in their business in this line. Officials of the leading commercial truck agencies here are very enthusiastic about the benefits to be derived from the present show and are working night and day to show the motor as a legitimate business investment.

The trucks shown at the show the opening night were: Ford, Packard, Peerless, White, Buick, Sampson, Pierce-Arrow, Little Giant and Reo.

SHOW AT DETROIT INCLUDED NEW TRUCKS

DETROIT, Feb. 23.—Detroit's 11th annual automobile show was held in the Wayne Hotel gardens and annex, last month, and served to introduce to the local public a much larger line of commercial vehicles than has been the case in former years. Also it enabled a number of newcomers to make their bow, conspicuous among which were the Lozier five-ton truck, a car that attracted no end of attention; Commerce trucks, made by the commercial division of the Chalmers Motor Company, the most recent Grabowsky models, and a varied showing of Sampson trucks by the United States Motor Company. American steam trucks, Seitz heavy vehicles and light delivery wagons by the Detroit Motor Wagon Company, General Motors, Buick, Detroit electric, Ford and others.

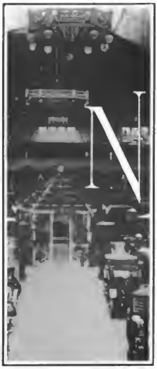
NEW SHOW COLISEUM FOR MINNEAPOLIS

The action of the board of tax levy in Minneapolis assures that city a show Coliseum some time early in March. This board has appropriated $25,000 for the annex to the National guard armory in that city. When completed the entire building will hold more than 9,000 people and will have a floor space of 72,000 square feet. With the aid of the Minneapolis Automobile Show association, the Minneapolis National guard has the promise of an additional $25,000, making a total of $50,000 for the new building. Of this amount the automobile association, which launched the movement, has given $10,000. The remainder has been promised by business men.

BUFFALO SHOW PLANS ABANDONED

BUFFALO, Feb. 3.—Owing to lack of interest and a desire not to entail unnecessary expense, the annual automobile show scheduled for Feb. fifth to 10th in this city has been declared off. Originally it was the prevailing opinion that a sufficient number of local automobile dealers would be willing to co-operate in a public exhibition at Convention hall similar to the event held the last week of Dec., 1911. Abandonment of the plans, however, has been announced officially.

Representative Newark Show Well Attended and Much Business Done



Center Aisle of Newark Show

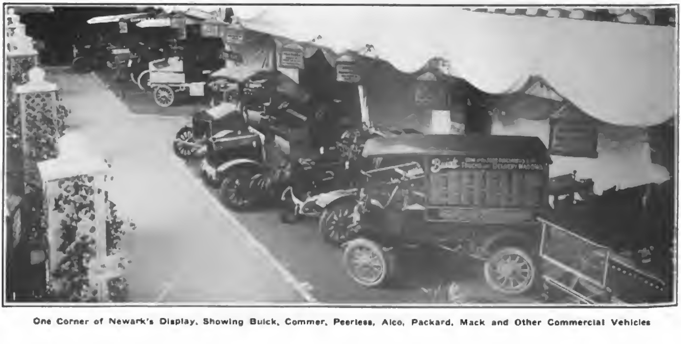
NEWARK might be looked upon as a small city in the metropolitan area, when compared with the size of either New York or Brooklyn, but when it comes to holding an automobile and truck show in combination, the dealers and agents in that city do not have to take off their hats to anyone in the Metropolitan area or elsewhere. Consequently the fifth annual exhibition of the New Jersey Automobile Exhibition Company, which opened in the First Regiment armory in that city on Feb. 17th for a week was a great success in every way.

Aside from the fact that within a 10-mile radius of this city are located some of the largest manufactories of automobile accessories in this country, such as electric horns, shock absorbers, carburetors, windshields, radiators, bearings, wood wheels, electric lighting devices and a score of other similar products, Newark is beginning to assume importance as a commercial vehicle manufacuring center. Here are located already the Newark, Lansden, W. L. S., formerly Commercial, and Brown-Santer factories, not to mention an addition to the main Mack plant and the Saurer establishment at Plainfield. Arrangements are under way for the forming or transfer of similar concerns. The comparative cheapness of factory sites here and the propinquity to the metropolis is the combination that is forcing Newark to the fore.

This had its influence upon the exhibits, for a large number of commercial cars were shown and attracted much attention. Of course, at a pleasure vehicle exhibition, not so much attention is paid to the utility cars, but in this enough interest was shown to warrant the management sounding out the exhibitors on the prospect for a separate week for trucks next year.

One salient point about Newark's shows in the past has been the amount and high character of the business done. This year was no exception in this respect. So large were the number of sales at the individual stands that the statement is made on good authority over 125 sales were closed. The majority of these were for touring cars, but the commercial agents expressed themselves as well satisfied. The latter, while hardly as enthusiastic as the pleasure-car men over the outcome, admitted that the show was well worth while. Sales of Garford, Flanders, Buick, Newark and other vehicles were recorded, while the number of excellent prospects secured during the week and the appointments made for demonstrations were such as to presage many additional orders for business vehicles later on.

In the general chorus of praise consequent upon the phenomenal business of the week, the management came in for but few criticisms. One of them, however, is worthy of noting here, and that is the early date of the show. There are not a few of the exhibitors who believe that it is a mistake to schedule the annual exhibition for a week when it is quite possible for a hang-over blizzard to negative in large measure the results of the show. These exhibitors think that the ideal time for a local show is just before the warm weather is to be expected, say about the last week in March, or a trifle earlier. Opponents of this idea, however, come back with the statement that in the event of an early spring, a portion of the harvest may be gathered by New York dealers



One Corner of Newark's Display, Showing Buick, Commer, Peerless, Alco, Packard, Mack and Other Commercial Vehicles

It was developed during an investigation of the sales made during the show that two-thirds of the business done by Newark's branch houses and agencies is outside the city limits, and that the proportion of money involved is even greater. This is due to the fact that about every establishment in Newark has a territory which extends possibly to the northern boundary of the state, and as far west in some instances as the Delaware river. In this territory is included some of the most desirable residential neighborhoods in the United States; it contains the homes of hosts of moneyed men who do business in and around the metropolis of the nation. They it is who have made Newark's annual show one of the best in the country from the viewpoint of actual sales of cars. This would seem to indicate a most unusual field for commercial vehicles and one that is not now being worked to the limit. True, there are many agents in the city and some of the New York firms regard this as their territory, but to develop the field right a closer contact must be made, and that can only be done through a Newark agency.

A Closer View of the Commercial Car Corner at Newark, Viewed from the Opposite Direction

Crowds at Display Across Bridge from New York

BROOKLYN, Feb. 28—After two days and three nights of the show here have passed, it can be stated as an unqualified success, both as to attendance and interest, and in the way of actual sales. The commercial vehicle interests are represented by some 22 different firms, a very small number of whom display both pleasure and commercial cars in the same stand. Those having both forms of car to show have separate places for the two with a different corps of men.

This is the second annual Brooklyn show and is held under the auspices of the Brooklyn Motor Vehicle Dealers' Association at the 23d Regiment armory on Bedford avenue, between Atlantic and Pacific streets. While this is an unusually large hall, the available space is filled to the limit. Moreover, though the building is somewhat inaccessible, the crowds each day and night have been composed in large part of people from Manhattan, many of them visitors to the two New York shows. They come here to study the vehicles in more detail.

For the opening night an attendance of 13,000 was claimed by the management, while Monday and Tuesday were said to be almost up to these figures. At that rate, the whole week will set new record figures for Brooklyn and approach very closely some of the larger New York displays.

Charles H. Green, who has long been a promoter of trade exhibitions, has the affair in charge, and the dealers' show committee consists of W. H. Kouwenhoven, chairman; J. D. Rourk, C. F. Batt, I. C. Kirkhan and C. M. Bishop.

In the matter of decorations, arrangement of space and general appearance the exhibition is in advance of last year's maiden attempt. The decorations are along the Spanish order, and the crimson and white bunting which has been used unsparingly transforms the large hall into a fitting show space for 82 makes of pleasure and commercial cars.

Although some dealers represent their factories to Brooklynites only, the activity of the majority covers a larger field. A number of dealers are metropolitan or even Eastern agents, with headquarters in Manhattan and a branch in Brooklyn; others conduct all their business from Manhattan, yet supply the whole state of New York, and sometimes Connecticut as well. Most exhibitors have Long Island included in their territory, and as it is a good touring ground, this territory alone would suffice to make the show a successful one. But in addition to the people coming from these localities, there are quite a number from out of town who, having seen many other shows without a final decision, come to Brooklyn to be translated from prospects into buyers.

This makes an interesting situation from the commercial point of view, showing as it does how poorly the territory available is supplied with the vehicles it should have. As for the show, this statement is proven by the increase in attendance each day and the large proportion of this interested in the commercial wagon section, which hundreds of business men have visited. The field for motor trucks in Brooklyn and Long Island is one of the best in the country. There are truck farms scattered in all parts of the island, which provide produce for the merchants in Manhattan and Brooklyn, and wise farmers

White Star, the Newcomer at the Brooklyn Show

have realized the importance of quick delivery. The towns on the island are connected by smooth highways, along which the farms are located, and it is only a matter of a few hours for produce to be delivered fresh to the markets from far points on the island.

There are 22 different makes of commercial wagons on view of all sizes, tonnages and capacities suitable for all lines of business. Many sales were reported yesterday. F. T. Bloxham sold a five-ton Peerless truck to the L. Michel Brewing Company. Other makes sold included Garford, Alco, Ford, Durable-Dayton and Packard.

The following firms are exhibiting commercial vehicles:

Commercial Cars at Brooklyn

American Locomotive Company, Alco.
Buick Motor Car Company, Buick.
Bruns Automobile Company, Durable-Dayton.
E. D. Roldman, Decatur.
Bishop, McCormick & Bishop, Ford.
Carpenter Motor Vehicle Company, Garford.
Farrell Auto Company, Cass.
Hexter Motor Company, Gramm.
Lewis Commercial Car Company, Poss and Knickerbocker.
Mootauk Garage, Pope-Hartford.
Ormond Motor Car Company, KisselKar.
Packard Motor Car Company of New York, Packard.
Peerless Motor Car Company, Peerless.
Prospect Park Square Garage and Sales Company, Crawford.
New York Auto Wagon Company, Brooks.
Sterling Place Garage and Sales Company, Lippard-Stewart.
Universal Truck Company, Universal.
M. J. Wolf, Autocar and Knox.
Wyckoff, Church & Partridge, Inc., Commer.
White Star Motor and Engineering Company, White Star.

Many Modern Motor Wagons at St. Louis

ST. LOUIS, Feb. 15.—While the truck display at the Sixth Annual Automobile show, Feb. fifth to 10th, inclusive, was not large, some of the most modern commercial vehicles were exhibited, and it is said that there was not one exhibitor who did not make a sale.

One day and night was set aside by the management for merchants. This was done so that they might attend the show and inspect the line of trucks on exhibition and at the same time have it demonstrated that it was cheaper to deliver their goods by a motor-propelled vehicle than by the horse-and-wagon method. Practically every merchant in the city received an invitation.

The truck that attracted the most attention and which was seen in St. Louis for the first time was the massive seven-ton Mack dumping truck. This was shown by the Mack Motor Truck Company. Other than this the concern had on display three different types of the Mack trucks, and a Saurer show chassis. The former were shown with stake and express bodies.

A line of Gramm trucks were shown by the Cochrane Motor Sales Company, the local agents, including: A five-ton stake body and a 1500-pound capacity modern express body, a one-ton with express body and a three-ton with a stake body.

One Corner of the Brooklyn Exhibit, Showing the Commercials as Seen from the Gallery Above

A Corner of the St. Louis Display, Showing Both Light and Heavy Trucks Exhibited

From the Avery Company of Peoria, Ill., was sent a five-ton Avery truck with stake body.

An excellent line of gasoline trucks were shown by the White Motor Car Company. This display included a 1500-pound capacity express body, and a five-ton with stake body. Another truck that was shown by this firm was a 1.5-ton recently made for the Waters-Pierce Oil Company.

Werbler Brothers of St. Louis had on display two Darts, the only trucks with air-cooled engines. These were light commercial delivery trucks, one with an open, the other with a covered flare-board express body.

Chase trucks were displayed by the Chase Motor Truck Sales agency the local representatives. This machine has a two-cycle motor and was shown with two styles of bodies, open and covered express.

Immediately after the closing of the show a meeting of the exhibitors was held and arrangements were completed for a two-week show next February. One week will probably be devoted to the display of trucks and the other will be taken up by the exhibition of pleasure cars. This gives an excellent idea of the show's success.

Many Trucks Sold at Southern Show

ATLANTA, Feb. 21.—Atlanta's second automobile show at the Auditorium-Armory came to a close on Saturday, Feb. 17, after the most brilliant week a show has ever had in the South. From the point of attendance, interest and business, it was pronounced a success.

The show was officially opened on Saturday afternoon, Feb. 10th, by Gov. Joseph M. Brown. When he threw the electric switch that turned on the blaze of illumination, the show stood forth in all of its brilliancy. Considering that the cars shown were solely ones on sale in Atlanta and the immediate vicinity, it was a wonderful display. Automobile men are a unit in declaring that it was the best business show they have attended, and while but state wide in its scope far surpassed the National show held here a couple of years ago in every particular.

Each day during the show was designated; one was theatrical, another society, a third military and so on. The famous Kilties band from Canada was engaged for

Atlanta's Exhibition Included Commercial Vehicles as Will be Seen in the Background, Right and Left the entire week and furnished music two hours each afternoon and evening. It is estimated that fully 25,000 paid admissions were recorded, the final day registering the largest attendance, a trifle over 6000. Many out-of-town visitors were present. But one day of bad weather marked the show and this came on the day when the *Athens Tribune* had planned a reliability run into the city, but rain and bad roads prevented. Sixty-six cars had been entered. Not to be deterred, however, the party, 238 in number, came down on a special train, were met at the station by the Kilties band and a delegation of local automobile men and escorted to the show.

The commercial cars on exhibit were: Autocar, Overland, Buick, Pope-Hartford, Velie, Baker electric, White, Ford delivery wagon, Pierce-Arrow and Alco.

From a business standpoint the show was a huge success. One firm sold 12 motorcycles, another four, while every dealer registered from two to five pleasure car sales, the Overland and Ford people registering the largest of the show with 10 each. The exact number of sales cannot be ascertained as the dealers do not care to give the names and sales until the cars are finally delivered. M. T. LaHatte, Jr., of the Dobbs-LaHatte company, agents here for the Autocar trucks, reported that his company had made three truck sales and had two others about closed. T. N. Nabers of Washington, Ga., bought one of the trucks and the other two were purchased by the Blue Seal Ice Cream Company. The first car of any description sold during the show was by the White company. The Coca-Cola company purchased a 1.5-ton truck. The Ford light delivery wagon, the Alco and Pope trucks were sold, the purchasers names not being learned.

The pronounced success of the show brings forth the announcement from its promoter, the Atlanta Automobile and Accessory Dealers' Association, that it is proposed to make it a yearly event.

Baltimore Holds First Commercial Show

BALTIMORE, Feb. 26.—For the first time since Baltimore has been the center of a motor car show, an exclusive commercial exhibition is now in progress. This opened this evening and will continue for three nights. The display is a most interesting one and takes up most of the available space in the Fifth Regiment armory. Last year about three commercial cars were represented and these displays were shown in connection with those of the pleasure vehicles. This week, however, there are 22 exhibitors showing 28 different makes of trucks and delivery wagons. Altogether about 55 models of machines are to be seen and this big increase in the show line, as far as Baltimore is concerned, gives some idea of the wonderful strides the commercial car has made during the past year in this section of the country. The show is under the auspices of the Baltimore Automobile Dealers' Association and the Automobile Club of Maryland. Many inquiries were made by prospective buyers on the opening night but most of these seemed somewhat dazzled as to which machine to select for business purposes, because of the fine array of cars. A number of good prospects have been obtained by the various dealers who look for busy times following the show. They believe that this will mean the beginning of another big year in the commercial car trade. The exhibitors and the cars they show are:

Atterbury Motor Company of Maryland, Atterbury.
Callahan Brothers, Morgan.
Chase Motor Truck Company, Chase.
Consolidated Gas, Electric Light and Power Co., General Electric Company wagons.
Enterprise Fuel Company, Gramm.
Everitt Auto Company of Maryland, Everitt and Board.
Ford Auto Company, Ford.
Foss-Hughes Company, Pierce-Arrow.
International Harvester Company of America, International.
International Motor Company, Mack and Saurer.
Kelly Motor Truck Company, Kelly.
Lozier Sales Company, Lozier.
Mar-Del Mobile Company, Packard.

Interior of the Montreal Show. A Few Trucks and Delivery Wagons May be Noted

Mt. Vernon Motor Company, Autocar.
Neely and Ensor, Kline and Alco.
Norwood Brothers, Inc., Seitz, Elmore and Lincoln.
Oakland Motor Company, Federal.
George R. Snodeal, Commer.
Standard Motor Company, Cadillac.
Stoddard-Dayton Auto Co. of Md., Sampson.
White Automobile Company, White.
Zell Motor Car Company, Peerless and Chalmers.

THOUSANDS AT CINCINNATI'S FIFTH SHOW

Cincinnati, Feb. 23—The fifth annual automobile show under the auspices of the Retail Automobile Dealers' Association, at Music hall, opened last Monday with great eclat, thousands of the city's social elite being in attendance, as well as the socially prominent of southwestern Ohio, southern Indiana, Kentucky and West Virginia.

Cincinnati's grand automobile event of the year was opened by a speech by Hon. Simeon Johnson, president of the Cincinnati city council, in behalf of Mayor Henry T. Hunt, congratulating the motor interests on the exceptional enterprise shown in securing such a remarkable show place as Music Hall, which has greater capacity than any other in this section of the state.

Months of arduous labor on the part of the directors preceded the auspicious event.

Spectators noted on all sides the presence of cars, cars, and more cars—all types, colors and sizes, and where no cars were to be seen there was no end of automobile accessories and parts. Tires, magnetos, spark plugs, carburetors, speedometers, shock absorbers, lubricants, axles, windshields, self-starters were there in profusion to bewilder the beholder. A flood of electric lights radiated down upon exhibits conservatively estimated to be worth $1,000,000.

The exhibitors numbered 67, the pleasure cars displayed numbered 400, the trucks 70.

The Cincinnati Automobile Dealers' Association is composed of 22 of the most prominent retail automobile dealers in the city, who represent the best and oldest manufacturers.

MOTOR TRUCK PARADE PLANNED FOR APRIL

New York City, Feb. 22—At the monthly meeting last night of the Motor Truck Club, held in the Automobile Club of America rooms, plans were discussed for the second annual motor truck parade. The date was set as April 13, a Saturday, as before. In order to promote this along more extensive lines than last year more time has been allowed. The work of the organization was divided into several committees. For special floats and decorated vehicles arrangements will be made individually.

There are said to be nearly 4000 motor trucks of all sizes in the city and an effort will be made to get out at least a tenth of them. The club will obtain a list of owners and canvass them individually in order to prevent any indiscriminate work.

The meeting discussed also the extent to which agents should stand back of the vehicles they sell in the matter of repairs, service, demonstration charges and other items. President D. C. Fenner of the International Motor Company occupied the chair, others present being: C. E. Stone, secretary, and P. K. Hexter, Hexter Motor Truck Company; L. A. Van Patten and T. A. Adams, American Locomotive Company; C. H. Martin, Knox Automobile Company; H. Robinson, Edison Electric Illuminating Company; E. Brooks, Remington Standard Company; C. W. Fletcher, Walter Motor Truck Company; N. Mallouf, Peerless Motor Car Company; M. R. Mechol, American-LaFrance Fire Engine Company; A. J. Slade, consulting truck engineer; E. C. Ludin, Midtown Garage; H. L. & M. G. Stockbridge, Polack Tire Company; W. A. Westlake, Goodyear Tire Company, and T. A. Aspell, Goodrich Tire Company.

WILMINGTON'S MUNICIPAL CARS INCREASED

Wilmington, Feb. 17—The Board of Park Commissioners has under consideration the matter of purchasing an automobile for Edward R. Mack, park superintendent, to replace a motorcycle, which he has been using for some time. The matter was proposed at the last meeting of the commission by William P. Bancroft, the president of the board, and while some opposition developed, from Councilman Weller E. Stover, who is chairman of the finance committee of the council, it is likely that the car will be secured.

Nearly all of the other city departments have automobiles. The street and sewer department has four, the water department one, the fire department five and the police one, a total of 11.

Incidentally, a new motor fire engine has just been added, being the product of the United States Fire Apparatus Company, a new Wilmington concern, which has a contract to build a second machine for the local department. This soon will be ready for delivery.

FIRST SHOW AT OTTAWA A BIG SUCCESS

Ottawa, Feb. 14—The Ottawa Valley Motor Car Association is responsible for the inauguration of this the first exhibition in the city. Judging by the crowds in attendance at the opening night at Howick hall success is assured. Commercial vehicles and the motor delivery wagon play a conspicuous part. Thirty-seven firms are exhibiting. The motor car exhibitors include 75 per cent. of the output in Canada and the United States. It is estimated that the attendance will number between 15,000 and 20,000, while 250 dealers are expected to be present.

KENNEDY HEADS ALCO TRUCK COST BUREAU

New York City, Feb. 22—It is announced that W. P. Kennedy, the leading transportation authority in America and identified with the motor truck industry for over 12 years, has been appointed head of the transportation cost bureau which has just been established by the American Locomotive Company. Mr. Kennedy, who has made a specialty of systematizing and analyzing various hauling methods, will make his headquarters at the Broadway address of this company in New York City.

NEW SALES AND SERVICE COMPANY IN R. I.

Providence, Feb. 26—A charter has been granted by the secretary of state here to a corporation to be known as the General Motor Truck and Service Company of Rhode Island. The organization of the company will be completed at a date in the near future, and capital stock will be issued to the amount of $100,000. The incorporators are Clarence G. Tompkins of Boston, Maus S. Wheelwright and Irving O. Hunt of this city.

The Trend of the Times in Truck Work

(*Continued from Page 27*)

where motor vehicles could be loaded expeditiously and without delay, and if such arrangements were in effect there would be no line-up of waiting motor vehicles and the congestion at present due to the horse being in the way would disappear immediately, at least for the motor vehicle. The horse vehicle, having its load handled piecemeal by methods that will be counted as archaic within the next few years, could not be accommodated at such a mechanically equipped platform.

The present freight handling methods in use at railroad terminals are recognized by most managements as somewhat barbarous and not at all in keeping with the efficiency being developed almost everywhere else in railroad operation. Considerable study has been given to the matter from time to time, particularly with the use of mechanical conveyors and other kindred devices in view. It would seem logical that the rise of the motor truck will soon force the issue and co-operative action between the railroad management and motor truck users will result in the joint development of load handling apparatus, which will insure preferential facilities for the latter, and obviously foster and encourage an increase in motor truck use in view of the advantages referred to.

The ordinary five-ton truck is geared to operate at or about eight miles an hour, but should this vehicle be modified for 10-ton loads its speed would have to be reduced to five or even four miles an hour in congested freight districts. This is practically a higher speed than can be maintained in such sections. An overload of this nature would not call for any modification of the original tire equipment as a truck in such service practically becomes a conveyor over a limited territory and ceases to call for the speed, tire and battery equipment which are necessary in extended delivery service.

If the load capacity of the truck be raised from five to 10 tons its ratio of operation is cut in half, but this reduction of mileage on a battery charge is insignificant because the truck in such service seldom moves more than six to eight miles a day. This reduction in daily mileage suggests the economy of even reducing the battery capacity further, or of avoiding so much investment as the normal battery capacity for more extended service demands. Furthermore, there is the possibility of modifying the tire equipment inasmuch as smaller tires might be used, although a more rational procedure would be to abandon rubber tires entirely in such service and use tires made from wood blocks. With these modifications of equipment it requires no stretch of the imagination to see immediately that in a so-called five-ton truck modified to act as a conveyor device of 10 tons the price might be reduced 50 per cent.; and if the investment in motor vehicles can be reduced to anything like this the economy resulting from their use begins to make the employment of horse vehicles extravagant in this class of work.

Wholesale Merchandise Transfer (2)—This division considers the transportation of wholesale merchandise between the warehouse and the different retail sections of the city. The differences between this service and that of freight transfers are many. Wholesale merchandise transfer calls for a heavy type of vehicle, although the radius of operation is somewhat restricted, but nothing as compared with that of freight depot work.

Merchandise transfer is a class of service in which auxiliary labor saving devices operated by the electric power of the truck become valuable. No one can walk through the wholesale district of any city without being impressed with the poor systems in existence for loading and unloading and the advantages to be derived from mechanical means. There are numerous devices recently introduced and employed principally in Eastern cities. Some of these consist in the use of three or four extra bodies which are loaded and unloaded readily onto the truck platform, not more than a few minutes being required to remove an empty body and replace it with a loaded one. Another is the use of small, wheeled warehouse trucks loaded on the different floors of the building and taken down the elevators to the loading platform. These trucks or wheeled crates are pushed onto the truck, their size being suitable to the motor vehicle body, and at the other end of the trip the unloading being similarly accomplished, there is a double saving of platform labor and an increase in the operating service of the motor truck since it is not necessary for the machine to remain idle for any length of time. There is great economy in operations of this nature and their development will do much to reduce the cost of merchandise transfer.

In the field of merchandise transfer between the wholesale and retail stores three and five-ton trucks are especially suited for the work. The speed of these vehicles will seldom average eight to nine miles an hour as in wholesale districts it will be impossible to make even the lower figure, and if the speed falls to six the motor truck will then be operating three times as fast as horse service; the average horse vehicle in merchandise transfer seldom making more than 1.5 miles an hour. There are of course exceptions to this speed restriction, one of which would be where grocery material and foodstuffs are to be delivered from the wholesale district to the small retail stores located in the more distant residential parts. In this a speed of 10 miles may be obtainable.

Merchandise Distribution (3)—By merchandise distribution is meant the delivery of goods from big retail stores in the city to the consumer, and this is the great field for the small electric vehicle with capacities from 1000 pounds to 4000 pounds. Cars in this service rarely have a daily mileage in excess of 35 and when scientifically installed and operated they will supersede three horse vehicles. The horse wagon in this service seldom has an average mileage of 15 a day and where mileages of 20 or 25 a day are required three horses are necessary, the third one alternating with the others.

The great advantage of the elecric vehicle in this field is the simple qualifications required of the driver. No mechanical knowledge whatever on his part is necessary as the equipment of the machine is entirely beyond his control except such as is necessary in stopping, starting and operating the machine, and even in these the performance of the machine is so prearranged and automatic that little judgment is required and no injury can be done. This feature of the electric makes the employment of ordinary labor possible and the horse driver can be utilized, which is a great boon to the retail merchant who is changing over. He is able to employ the same help formerly used and which undoubtedly has been selected after years of tedious watchfulness, and with the further advantage that it is familiar with the customers. This latter qualification becomes imperative in handling valuable merchandise and C. O. D. deliveries, and it goes without saying that if the electric vehicle is so installed as to supersede three horse vehicles the number of drivers will be reduced from three to one, with a consequent saving in labor cost.

Express Service (4)—The express business has its own characteristics and while it may not be feasible to make any serious reduction in the number of drivers as can be done in merchandise distribution, a great time saving can be accomplished. This is possible in that the operations of the express business are so systematic and regular as to permit of application of electric vehicles in such a manner as will reduce considerably the time element, which is of remarkable high monetary value.

There are two classes of vehicles applicable in this service. The first for long distance high speed transfer work between railroad terminals and sub-stations or distributing depots scattered throughout the express company's territory. It is customary to do this work with gasoline machines. The second field of service is the pick-up of express matter and also the delivery between the distributing depots and persons to whom goods have been consigned. The electric vehicle is especially well fitted for this work. In this pick-up and distribution work the two-ton electric is in favor, although the load carrying capacity is largely governed by the work to be done and the one-ton machine is well suited for those sections of the city in which light loads are customary. In this class of service speed is an important consideration and dependent upon traffic this may be as high as 12 miles an hour, while the mileage seldom exceeds 30 a day.

How Chicago's Coal Supply Is Handled

(*Continued from Page* 43)

stop the biggest waste in modern civilization—the unnecessary cost of the distribution of goods.

The actual figures of the test as furnished by the Pierce company follow:

SPECIMEN OF DAY'S WORK ON JANUARY 12, 1912.

Temperature 12° Below Zero.

Arrived.	Place.	Left.	Number of Tons.	Time at Stops.
7:13	City Fuel Company	7:40	5.3	27 min.
8:00	The Hub	8:25	...	25 "
8:45	City Fuel Company	9:00	5.6	15 "
9:10	Karpen building	9:25	...	15 "
9:40	City Foel Company	9:55	5.7	15 "
10:10	Michigan avenue and 21st street	10:35	...	25 "
10:47	City Fuel Co.	11:05	5.1	18 "
11:20	Karpen building	11:35	...	15 "
12:35	City Fuel Company	1:25	5.7	50 "
1:50	Dearborn Power	2:05	...	15 "
2:20	City Fuel Company	2:40	6	20 "
2:55	Karpen building	3:20	...	25 "
4:05	City Fuel Company	4:35	6.2	30 "
4:55	Cosmopolitan Electric	5:15	...	20 "
5:35	City Fuel Company	6:05	5.7	30 "
6:15	Dearborn Power	6:35	...	20 "
7:00	City Fuel Company	7:35	5.8	35 "
7:50	Mandel Bros.	8:35	...	45 "
8:40	City Fuel Company	8:55	5.8	15 "
9:40	Mandrel Bros.	10:05	...	25 "
10:35	City Fuel Company	11:00	5.1	15 "
11:30	Mandel Bros.	12:00	...	30 "
12:35	City Fnel Company	1:10	5.9	35 "
2:30	Mandel Bros.	2:50	...	20 "
3:25	City Fuel Company	3:45	5.5	20 "
4:15	Mandel Bros.	4:30	...	15 "
5:45	City Fuel Company	6:05	5	20 "
6:35	Mandel Bros.	7:00	...	25 "
7:15	H. Paolman & Co.	...	...	..

SUMMARY:

Miles run—74.4 miles.
Tonnage carried—78.5 tons.
Number of trips—14.
Net running time—12 hours 57 minotes.
Total time—24 hours two minutes.

BASIS OF FIXED CHARGES.

Investment of Truck, $5,000.00.

1. Interest at five per cent. a year	$250.00
2. General insurance	175.00
3. Garage at $20.00 a month	240.00
4. Driver at $20.00 a week	1,000.00
	$1,665.00
Fixed charges each year	$1,665.00
Fixed charges a day (1-365)	4.53

COST A MILE.

A. Tires—8,000 miles at $488.95	.06110
B. Gasoline—4.5 M. P. G. at 10 cents	.02200
C. Lubrication motor—250 M. P. G. qt. 60 cents	.00240
" transmission—5,000 miles to five gal. at 65 cents	.00065
" rear axle—5,000 miles to five gal. at 65 cents	.00065
D. Allowance for daily repairs and overhaul (maintained and overhauled at 150,000 miles)	.03500
E. Depreciation at 150,000 miles	.02870
Operating expense, one mile	.15050

DAILY COST.

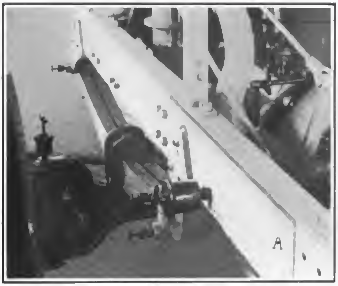
January 11th.	Fixed charges a day	4.53
	46.5 miles at .15050	6.99
		11.52
	Hence it will cost $\frac{11.52}{50.75}$ or .226 a ton to haul or .011 a cwt.	
January 12th.	Fixed charges a day	4.53
	74.4 miles at .15050	11.19
		15.72
	Hence it will cost $\frac{15.72}{78.50}$ or .200 a ton to haul or .010 a cwt.	
January 13th.	Fixed charges a day	4.53
	45.1 miles at .15050	6.82
		11.35
	Hence it will cost $\frac{11.35}{48.50}$ or .233 a ton to haul or .011 a cwt.	
January 14th.	Fixed charges a day	4.53
	33 miles at .15050	4.96
		9.49
	Hence it will cost $\frac{9.49}{31.40}$ or .302 a ton to haul or .015 a cwt.	
January 15th.	Fixed charges a day	4.53
	68.4 miles at .15050	10.29
		14.82
	Hence it will cost $\frac{14.82}{72.20}$ or .202 a ton to haul or .010 a cwt.	
January 16th.	Fixed charges a day	4.53
	34 miles at .15050	5.11
		9.64
	Hence it will cost $\frac{9.64}{33.40}$ or .288 a ton to haul or .014 a cwt.	
January 17th.	Fixed charges a day	4.53
	41.5 miles at .15050	6.24
		10.77
	Hence it will cost $\frac{10.77}{39.40}$ or .274 a ton to haul or .013 a cwt.	

COSTS A TON

January 11th.	Average cost a ton	$.226
" 12th.	" " " "	.200
" 13th.	" " " "	.233
" 14th.	" " " "	.302
" 15th.	" " " "	.202
" 16th.	" " " "	.288
" 17th	" " " "	.274
	Average cost a ton for the week	$.246

Improvement in 1912 Truck Lubrication

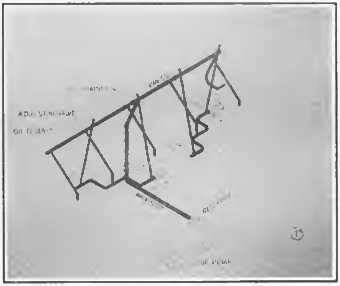
Ways and Means by Which the Vehicles for the Coming Year Are Made More Serviceable and Able to Carry Out Their Scheduled Work More Economically and Efficiently—Grease and Oil Cups



Lubricating the Spring, Axle and Shaft Parts

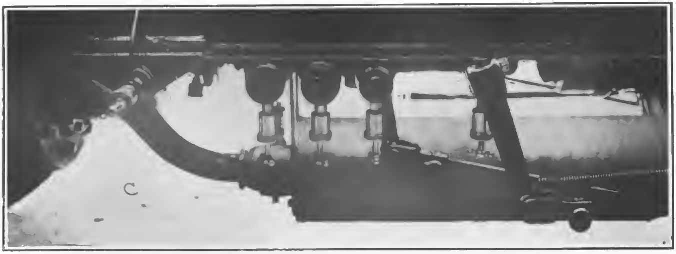
A—Series of large grease cups on the three-ton Dayton chassis, which are used for oiling and greasing these very important points. The cups are unusually large and so located as to be accessible to the driver. Each fixed spring end carries one, each shackle two, while the axle has a large upper one for the interior and thrust bearings, as well as another down on the side. The big one in the foreground is for the clutch shaft bearing, a flexible metal tube connecting it.

LUBRICATION is a most interesting subject, but it must be stated that it has not always had the full measure of attention from manufacturers; in fact, many of our best vehicles of but a year ago were sadly lacking in proper means for lubricating the wearing and rubbing surfaces, to say nothing of making the apparatus fitted for this purpose accessible. Today all that is changed, and all makers are using all kinds of oiling accessories and placing them, too, where they will be so handy for the driver that he will have no excuse for avoiding them.



How the Knox Motor Is Oiled Throughout

B—The method of lubricating the crankshaft and camshaft parts of various motors is most interesting for the engine is surely the heart of the car. On the Knox trucks the gear pump supplies oil to a cross tube in the crankcase. This leads to a longitudinal main feed tube along the opposite side of the engine, this having a branch to each main bearing. From these, the oil circulates inside of the crankshaft up to the connecting rod pins, and thus out onto the cylinder walls.



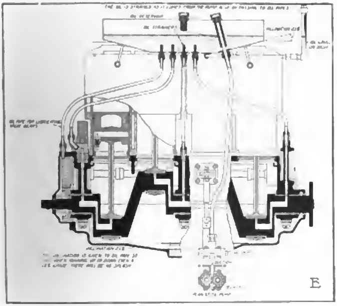
Grease Cups in Profusion on the Heavier Form of Trucks

C—One of the biggest commercial vehicles on the market, the Morgan five-ton car, has like the two and three-ton carriers of the same make generous provision for oiling. Along the side of the car, just below the main frame, a series of very large cups hang downward, as a horizontal position would make them project so as to be liable to encounter obstacles and be broken off. These are connected by hollow flexible tubing to the various bearings and moving parts which need lubricant, including the clutch bearings, main shaft, gear shifting shafts, brake operating shafts and others. The springs slide on removable wearing plates and these have a large cup also, two of which may be noted, one on the near, the other on the far side of the car.

An Example of the Very Large Two-Compartment Form of Tank

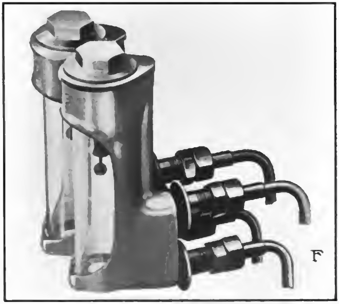
D—One of the seven-ton brewing trucks seen at Madison Square Garden, showing the right side with the big tank. This is divided into two parts, the larger for gasoline and the smaller for lubricating oil. Both are forced out under pressure, the pipes for this being visible under the frame at the right. A hand pump near the driver's seat furnishes the required pressure and is very simple and not liable to derangement. This position of the tank is a very safe one and makes filling more easy than if it were placed under the seat which requires handing the heavy gasoline up quite a distance each time. As a matter of fact, this location allows of a much larger size than would be possible under the seat, even with a square form, for the tank can extend many feet if desirable.

In the cars for 1912, as seen at the New York and Chicago displays, grease cups with large handles and so located as to be reached without crawling under the chassis, were noted on about all of the best cars. True, a few of the lowest priced vehicles did not have everything that is desirable in this line, but these were the exceptions. In the matter of spring shackles, for instance, a year or so ago, very few manufacturers of commercial trucks fitted any form of shackle oilers, but today these are found on all cars, many going so far as to make the bolt with external grooves for circulation and internal holes for supply. Where springs slide, they, too, are fitted with either an oil or grease cup above. A new car noted at the Palace show had the ends of the springs and of the one-piece shackle enclosed in a leather boot filled with grease, very similar to the present method of covering and lubricating universal joints.



Gravity Oil Flow System on Pierce Trucks

E—One point which is notable about the Pierce-Arrow commercial chassis, the same as the pleasure cars of this firm, is the method of lubricating the engine parts by gravity. This is accomplished by slinging a large tank on the upper side of the cylinders and pumping oil to it by means of a gear pump feeding from the lower half of the crankcase. The pump fills the tank, whence the oil flows by a series of pipes to the gears and main crankshaft bearings. The hollow shaft then leads it to the pins and other parts.



One Successful Form of Dash Sight Feed Glass

F—On Packard trucks the lubricating system includes a telltale located on the dash where it is in front of the driver at all times. The instruction book tells him how much oil should feed through it at all times, and by following the simple instructions, and counting the drops in the two glasses, he can be sure of giving all engine parts the correct amount of oil. Aside from the possibility of breaking the glass, there is no chance for accident or trouble with this useful and economical accessory.

In the main dashboards have been kept clear without any accessories located thereon, but where they are so placed, the telltale for the motor oiling system has been invariably the only one. These come in a variety of styles, but the one most favored has a large enough glass of a round shape to show the drops flowing. By using a watch, the operator can determine the exact number a minute.

News Notes of the Big Foreign Shows

Commercial Cars and Accessories Seen at the Mixed Glasgow Display—Notable Small Wagons—Preparing for Manchester's Exhibition

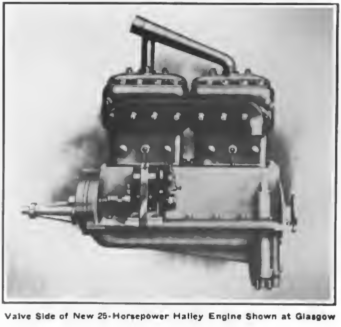
One of the 1500-Pound Argyll Delivery Wagons Seen at Glasgow

FROM the 12th to the 20th of January a mixed motor show was held at Glasgow, Scotland, in the Industrial hall, Kelvin Grove, which among the commercial vehicles included some interesting specimens. All the Scotch and several of the English makers were there with commercial chassis, so that the hall, which measures 180 feet by 90, was pretty well filled. The Scotch, by the way, are very Scotch, this being emphasized by the decorations in the form of thistle-pattern bordering on almost everything available to hold it, and shields with the national heraldic lions thereon.

Of the Scottish makers, it may be noted that there are three famous factories almost in the immediate neighborhood—the Albion, Argyll, and Halley's. The first named, the Albion Motor Car Company, Ltd., with its works at Scotstoun, staged on stand 4 a 32-horsepower 30-seated torpedo char-à-banc, with a wheelbase of 157 inches. The body of this special torpedo type has doors at the front only, and a passage down the center between the seats; this passage, by the way, is fitted with tip-up seats, so that when the permanent seats, accommodating 25, are filled the passage with its seats will accommodate five more. The body has removable sides and windows for winter use, and roll-up curtains for summer touring. An Albion mileage record is fitted and Continental T pattern solid tires of 880 by 120 mm. dimensions are fitted to the wheels, twins of course to the rear. The driver is enabled in the above vehicle to collect the fares by means of the door arrangement, which either in entirety or partially has been copied largely by body builders during the last season in Britain after a similar vehicle had been shown for the first time at Edinburgh, and secondly at Manchester last year. The Albion Company also staged a two-cylinder 16-horsepower 2000-pound wagon with a builtup wooden body, finished to the order of a Glasgow purchaser. This light wagon has a 117-inch wheelbase, while its especial body has a luggage rail on the roof, canopy over the driver, and is finished in blue with gold lettering. The third commercial Albion exhibit consisted of a 2500-pound canvas-topped wagon of similar horsepower to the above, but with a wheelbase exceeding it by two inches. Albion mileage recorders were fitted to both.

Argylls, Ltd., with works at Alexandria, near Glasgow, secured stand 1 and showed several good examples of light commercial vehicles. We illustrate on this page one of the exhibits, a 15-horsepower four-cylinder 1500-pound wagon. In addition to this there were another of similar type, a taxicab and a fire tender capable of carrying six men, 1000 feet of hose and extinguishers. All the commercial Argylls shown were on the same pattern chassis, this having a 15-horsepower four-cylinder motor of 80-mm. bore and 120-mm. stroke. A plain metal-to-metal flat plate clutch transmits the power through a three-speed and reverse gearset to the worm-drive axle. All the models shown by Argylls are on pneumatics, and the wheelbase in each instance is 106 inches and the track 56 inches. The four-seated taxicab has 815 by 105 Dunlop tires, and complete with everything ready for service is offered at $2,150, while the first aid car and the delivery wagons are $150 cheaper.

Four commercial chassis either complete with bodies or in the form mentioned were shown by Messrs. Halley's Industrial Motors, Ltd., of Yoker, Glasgow. The biggest was a 40-horsepower truck with a flat platform body for general goods carrying, it being an order from Utility Motors, Ltd., of Burnly. The capacity of this vehicle is five tons, and it has pressed steel wheels fitted with an ample section of solid rubber tires. The second machine took the shape of a standard three-ton truck, illustrated herewith, this being fitted with a 34-horsepower four-cylinder motor, and the third an 18-horsepower twin-cylinder worm-driven wagon for light loads,



Valve Side of New 25-Horsepower Halley Engine Shown at Glasgow sold to Messrs. Daly & Co., Ltd., local drapers. For some years past all the Halley industrials for reasonably light loads have been worm-driven, but for loads of 3000 pounds upward chain drive has been standardized. Halley's fourth exhibit was something new and very neat in the shape of a 25-horsepower four-cylinder chassis for carrying two tons, or for fast passenger work. This chassis included all that could be thought of in 1912 development, and therefore embodies the latest improvements.

Commercial Cars, Ltd., of Luton, Beds., who have a depot at 80 Mitchell street, Glasgow, staged a fine selection of the machines, the exhibit including a 23-seated char-à-banc, handsomely finished with a torpedo body, storm curtains, wind screen, and upholstered in red leather; a three-ton truck with a 25-horsepower motor; a special public service chassis with the same size engine as the three-tonner, but with special springs to the chassis and other refinements, rendering it highly suitable for passenger service, and a 32-horsepower C.C. engine, which, by the way, is fitted to four-ton trucks.

The only steam truck in the show was from the works of Messrs. D. Stewart & Co., Ltd., and was a five-tonner on steel tires, made under the Thornycroft license, the latter firm having given up steam vehicles for gasoline.

A good stand of commercial vehicles of general interest was fitted up by Messrs. Rennie & Prosser, Ltd., well-known Glasgow motor agents. They had on view a 35-horsepower three- to four-ton Dennis worm-driven truck, three and five-ton American White chassis and a 1500-pound 14-16-horsepower express Belsize delivery wagon. Some dozen tire firms exhibited solids suitable for loads up to 12 tons, but as we hope to deal with rubber tires in detail in this journal later on we will defer more than a mention of them.

Three-Ton Halley Truck Chassis Displayed to Advantage at Glasgow

Preparing for the Show at Manchester, England

EFFORTS are being made by the Provincial Shows branch of the Society of Motor Manufacturers & Traders, Ltd., in England, to arrange for a representative motor show at Manchester between February 16 and 23. At the time of writing it is uncertain whether the hall at Rusholme, a suburb of Manchester, or the City hall will be used. The latter, however, is the best from a business point of view, as it is convenient to get at. Although there are bound to be some wry faces over the results of the ballot for spaces—when as often as not some one with a group of four or five-ton trucks or wagons gets a few yards of space to cram them on—the pick of the heavy self-propelled vehicles in England will undoubtedly be exhibited at "Cottonopolis."

Of the principal firms after space, Leyland Motors, Ltd., of Leyland, Lancs., and Belsize Motors, Ltd., of Manchester, were not quite sure when our correspondent mailed this as to what they would stage. The latter, however, will probably have a three-ton truck, a heavy chassis, a 1500-pound wagon, and a taxicab on view. Alley & MacLelland, Ltd., of Glasgow, will stage a five-ton steam truck; Argylls, Ltd., a 15-horsepower first aid car and a 15-horsepower worm-driven business chassis; Commercial Cars, Ltd., a five-ton truck, a 15-horsepower sight-seeing car and a two-ton covered wagon. These, however, may vary according to the space they are allotted. Clayton & Co. (Huddersfield), Ltd., hope to stage four chassis, but are uncertain about the types at the time of writing. The remaining firms who hope to be showing at Manchester are Fodens, Ltd., Sandbach, Cheshire, three and five-ton steam trucks; Lacre Motor Car Company, Ltd., two-ton chassis; Dennis Bros., Ltd., Guildford, Surrey, fire apparatus, most probably a 70-horsepower six-cylinder engine, a heavy chassis, and a two-ton covered wagon, all worm-driven; Mann & Overton's, Ltd., 12-14-horsepower Unic light covered wagon and a four-cylinder taxicab chassis, and lastly the English branch of the White Company hopes to stage a three-ton chassis and a 1500-pound wagon.

There is said to be a future for 5000 five-ton motor trucks in Manchester and its district, and this no doubt accounts for a great deal of the enthusiasm which is displayed over the annual shows. The S.M.M.T. have wisely given up motor shows of business vehicles only in London altogether.

Electric Automobiles.—An American consul in the United Kingdom reports that a firm in his district has expressed a desire to secure the agency of an American electric automobile, a machine to cost about $1500 being preferred. The consul states that the firm in question has had great success in promoting the sale of other American-made cars, and believes it will be equally successful in placing a popular-priced electric machine.—No. 7780. Consular Service.

One evidence of prosperity in Mozambique is the great success attained by the public motor cabs. There are now eight on the stand, and they are said to take in an average of $500 each a month. The American cars of 1909 are still running, but no more were bought as they proved too light to stand the strain of cab service. Among the latest importations is a Humber five-passenger touring car and a German seven-passenger car.

During the past 25 years over 100 important new rubber-goods concerns have been established in Germany, according to an article in the *Gummi Zeitung* (Berlin).

Mechanical Notes for Truck Drivers

Removing Valves with Stiff Springs

It is extremely difficult to take off any form of valve on which a coil spring is used, but more so when the valve is unusually stiff and strong. Designers often make their springs in this way because of high compression pressure or other items in the motor design, and the user and repair man have to contend with them. To remove a valve with such a spring, some form of tool is needed; this must hold the valve down and press the spring upward so that the valve key can be removed from below. While it sounds simple, it is not easy. In the sketch herewith a form of tool is shown, this being an article which may be bought at any repair store or may be constructed by any one unable to buy it.

The body would be a peculiar shaped forging as would be the handle also, the latter carrying a series of side notches for the chain, which connects the two parts. The body or upper part has a hardened point, a long curve to pass over the valve cap opening and metal outside of it, and a looped lower end for the chain. In use, the loop is placed on top of the valve, care being used to locate it correctly; then the handle is slipped under the spring washer, but inclined upward as far as possible. Next the chain is slid into the notch, the upwardly inclined position of the handle allowing of the use of the chain as the fulcrum in pressing down on the handle and thus, up on the washer and spring. As soon as these have been raised enough to clear the key, it may be withdrawn and the spring allowed to expand, carrying with it the washer. Then the valve may be removed.

Many makers cast a lug, or a couple of them, on the side of the cylinder to act as the fulcrum, in which case the valve can be blocked from above and a screwdriver or flat piece of metal used for prying. Another form of special tool is made to work upwards from the top of the crank-case, in the use of which the valve must be blocked in place from above as previously described.

Tire Valves and Their Faults

Enough small commercial vehicles utilize pneumatic tires to make any point about them of interest to the delivery wagon driver and mechanic. From this point of view the remarks of a prominent tire man will be of value. His comment was: It is a remarkable fact that the valve insides today are the same as were used 20 years ago on bicycle tires. In fact, this is about the only individual part of automobile construction that has not been improved greatly. My observation is that a great deal of tire trouble is due to leaky valves and this is particularly annoying, because frequently the real cause is not discovered until after the shoe has been taken off. In any event, the only remedy is replacing the valve-inside, and this necessiates pumping an empty tube. Furthermore, if the inside sticks it is more than likely that the little prongs at the top will be twisted off so that the inside cannot be removed at all.

Often, assuming that no difficulty has been experienced in taking out the inside, a new one will not remedy the trouble, because the small external rubber washers rot and stretch so fast that they are quite likely to be defective, although apparently in good condition. Furthermore, the inner metal shoulder in the outer tube, against which this washer sets, may be burred or worn, and the least defect will cause the washer to tear.

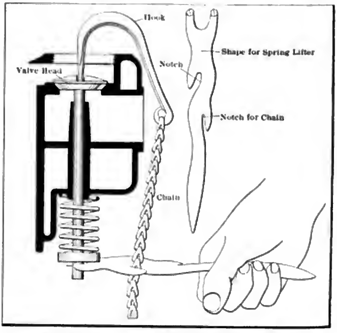
Great care is needed in inserting the inside, because it must be screwed down to seat the washer, but if too tight it may tear the latter. I have put into the same tube two or three new insides in succession without stopping the leak, and the pumping involved produced as much perspiration as would result from an equal number of punctures.

I have also seen persistent leaks through the check valves themselves. These are so infinitesimally small small that it is impossible to tell by inspection whether they are defective or not, so that it is a matter of luck whether or no a new inside will remedy the difficulty. The small size of the inflating passage and the proportionally large back pressure area result in the use of a great deal more muscle than ought to be necessary.

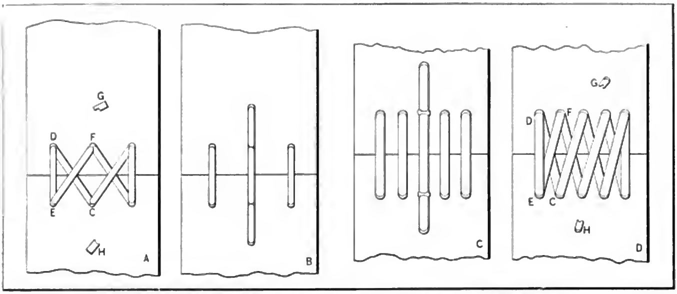
On several occasions during the past four years I have had a whole new valve put into an otherwise serviceable tube. This is more expensive than any other tube repair; and, furthermore, if the repair is carelessly done the tube is likely to be spoiled.

Testing Out Dry Batteries

Many amateur drivers would test out and prove the utility of their dry cells if they but knew how to use a



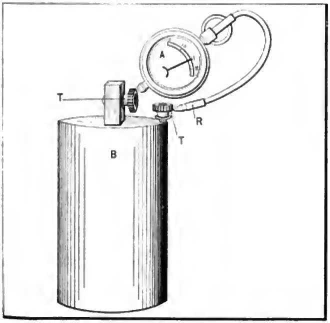
Using the Chain Tool for Removing Valve and Spring



Two Forms of Belt Lacing for Accessory Drives, Which Are Easily Learned and Useful

voltmeter or ammeter. In the sketch shown below on this page one of these, of the watch or pocket size, is seen in position. These have two dials, or rather one with figures above and below. The latter represent the volts and the former the amperes, different base points being touched to the battery terminals to indicate either the amount or strength of current. The one shown at A, however, is but an ammeter, the second pole and dial being left off for clarity.

To utilize this, the ends are cleaned off and the one on the bottom of the instrument T placed against the central terminal or electrode of the battery B, while the other end, R, is touched to the second terminal at the side. As shown in the sketch, this will indicate the amperage, the dial showing 20. This is a low but very serviceable figure. In testing, the user should look for a figure below 15, as cells with this should be watched carefully, while any that drop to 10 should be taken out and replaced. If this be done instead of allowing them to go dead, they can be placed on a high, dry and dark shelf somewhere and allowed to recuperate, so that they can be used again.



Method of Applying Vest-Pocket Ammeter to Battery

In buying new cells, those which run above 25 and as high as 30 should be avoided and a lot which are very close together around 22 and 25 selected. The former, which test high at the outset, do not last as long as the lower testing kind, on the principle that there is but so much current to be had, and taking more each time uses up the total quicker. The writer had an experience with this kind, in which a large set testing 28 throughout were selected and wired in place. The switch plug was left in place accidentally and the multiple-series winding giving a higher amperage being more susceptible to leak, soon found a weak spot, and the non-use of the car for 10 days resulted in an exhausted set of batteries, although new at the outset.

Belts and Belt Lacings

While there are not as many belt drives for fans, pumps, magnetos and lighting outfits as was the case formerly, there are some still in use. One thing about these which always gave trouble, particularly with flat belts, was the matter of lacings. For this reason, some sketches of proper lacings are shown above and will be explained. While these were laid out for slightly wider belts than are used ordinarily on automobiles and trucks, the principle is the same.

The form at A shows a six-hole method, B presenting the back view with the disposition of the ends. In this, the lace is started at G, passed to and through the hole C, thence diagonally to D, through and across the back and out at E. From there diagonally back to the center line of holes at F is the next move, followed by a back loop to C. Then the previous lacing is repeated on the right side, ending at F, where a back loop to G furnishes an end for fastening. In the sketch A, two misleading front loops from D to E, and the same on the right, are shown by mistake. The second form seen in D, with back view at C, is very similar and is worked out in a duplicate manner, the difference being 10 holes instead of six, and five rows of lacing in place of three. This is used of course, only on wider belts, since a very narrow form would not allow of the five rows. It may be followed through by using the letters as in A and B.

Harking Back Half a Decade

IT IS interesting to note that with this issue the COMMERCIAL VEHICLE, the oldest paper in this field, celebrates its sixth birthday. A glance over the six years which have passed since the establishment of this pioneer paper shows a number of items which are of wide interest viewed from the standpoint of today. For this reason this paper will publish each month a series of short notes which appeared in the corresponding issues of 1906. The following are from March issue:

Last fall the Auto Express Company, of Detroit, gave an order to the Olds Motor Works for a number of model F delivery wagons. The first lot was delivered in October last and now the Auto Express Company has in daily operation 15 of these machines and one heavy Olds platform truck. The latter has been in use only a short time and represents an expansion of the business of the company in the direction of handling heavy freight.

Taking a broad view of the situation, it may be said that the commercial automobile of today is passing through the stage that marks its transition from a state of doubtful utility and half-proven practicability to a well-defined position as an economic factor of commerce. The commercial automobile—a term which may be taken to include delivery wagons, drays, trucks, public passenger vehicles, and other motor-propelled vehicles whose reason for existence is their utility as money-makers or money-savers—is not yet generally accepted as a success, for it is too much a novelty and too little known to have attained general recognition. Neither is it a failure. Many tests have proved its merit to the satisfaction of individual users, and the days of tentative experiments and groping for a basis to work on are past, generally speaking, builders having a more or less definite knowledge of what is required and how to produce machines suited to the work.

Paris, Feb. 16.—This is a department of the automobile industry in which the French had for a rather long time shown very little activity, but to the immense possibilities of which they have now completely awakened up, and they are at present striving to gain and hold in this class of self-propelled vehicles the same reputation which they won for themselves in the touring machine class. The only attention that was given to commercial vehicles in France in the years previous to 1905 consisted of competitions of little if any importance to which nobody but the jury and the "few and far between" competitors attached any weight. Last year, however, the Automobile Club of France at last lent a willing ear to the claims and complaints of a number of progressive makers, frightened by the support which foreign clubs (especially in Germany and England) were beginning to lend to a growing industry in their own country.

Among steam tractors the only noteworthy examples were the Purrey, Chaboche, Turgan and the special Serpollet for the Renard train. These French tractors show no general alterations from previous patterns, the only points changed being details of little importance, which were improved to decrease the chances of trouble. England was only represented for all classes of commercial vehicles by Thornycroft, who exhibited a nine-ton steam tractor, built in France under license from the parent concern.

Things came to such a pass that finally, in order to sell trucks at all, one company established in New York a large stable or garage of its own, where wagons and trucks could be taken care of systematically and by an expert staff. A fixed sum each annum was charged for a vehicle, and a prospective purchaser knew at once just how much his motor wagon was going to cost him. Confidence was thus reestablished and the electric truck was able to resume its proper place. It is quite probable that this step was taken at what we can term the phsycological moment, as it gave the opportunity for the development and education of the expert caretaker or wagon foreman so sorely needed.

Around the Flatiron building, Broadway, Fifth avenue, 22nd and 23rd streets, New York, three companies are now maintaining daily service of large cars. The American Sight-seeing Car and Coach Company, with offices in the Flatiron building, operates a number of large cars which are designed for the accommodation of 40 passengers each, the seats being arranged on top of a deck, under which is a compartment for the stowage of the canopy top, tools and sundries. The batteries, 44 Exide cells, are carried in a tray slung under the body, and drive is through two independent General Electric Company's motors, geared to the rear wheels. The radius of action is about 30 miles, with a maximum speed of seven miles an hour. Tires are solid rubber, six in. wide, with flat tread. The weight of the vehicle is 7900 lb.

A gasoline truck of unusual design and very strongly constructed is the Atlas three-ton truck manufactured by the Knox Motor Truck Company, of Springfield, Mass. The main feature of the machine is the method of placing the water-cooled motor and the transmission mechanism, which are grouped just in front of the rear axle, as the engraving shows.

A good example of the heavy electric truck is shown in the engraving of a Columbia five-ton truck, manufactured by the Electric Vehicle Company, of Hartford, Conn. The Columbia vehicles for commercial use range in capacity from 1000-lb. delivery wagons to trucks of the capacity of the one illustrated, but all embody similar features, differing only in size and power, and in details which are influenced by size and power.

A striking example of steam truck practice is shown in the American Coulthard Truck, manufactured by the American Coulthard Company, of Chicago and Boston, under license from the British owners of the Coulthard patents. In general, the truck is the same as the British machine, which has been in the field for some time and has attained a considerable degree of success.

A gasoline truck having a carrying capacity sufficient for all but the heaviest class of service, and equipped with a four-cylinder motor of sufficient power to handle the load under all conditions to be found in such work, is manufactured by the American Motor Truck Company, of Lockport, N. Y., under the name of the American truck.

The Packard 3000-lb. gasoline truck, built by the Packard Motor Car Company, of Detroit, Mich., is an excellent example of a commercial vehicle to which many of the refinements employed in pleasure cars are applied to reduce friction and give convenience in handling. The motor has two vertical water-cooled cylinders placed under the driver's seat, and develops 14 horsepower.

Commercial vehicles for various purposes are manufactured by the Knox Automobile Company, of Springfield, Mass., in sizes varying from a light delivery wagon having a carrying capacity of 1000 lb. to a heavy truck with a capacity of three tons.

For carrying loads up to one-ton weight and for making fairly speedy runs in city and suburban work cars of the type represented by the Oldsmobile delivery wagon built by the Olds Motor Works, of Lansing, Mich., are very suitable. This machine is fitted with a gasoline motor of 16-18 miles an hour.

Under the title of Methods of Gasoline Motor Regulation, by Joseph Tracy, he says, it is generally conceded that, if the motor car is to be used extensively for business purposes, it must be designed and built so that it can be operated satisfactorily by comparatively unskilled men. Such being the case, it is evident that the governing methods which are in use on pleasure cars at the present day would be unsuitable. Diaphragms, automatic air valves, and other delicate parts can hardly be expected to function properly unless cared for by experienced drivers.

The use of commercial vehicles in Buffalo is confined to five or six concerns, aside from those using small pleasure cars with delivery bodies. The attitude of business men toward the commercial vehicle is very favorable, however, and manufacturers and dealers believe that Buffalo is awakening to the importance of the matter.

The Jaynes Automobile Company, of Buffalo, which has hitherto done a general automobile business, will give up its garage, storage and sundries business and confine itself to the sale of cars, giving special attention to commercial vehicles, to which branch all the company's attention will eventually be given.

The George N. Pierce Company expects to go into the manufacture of commercial vehicles, though it is not likely this will be done until a new factory, now being planned, is completed.

The Adams Express Company is the largest user of commercial vehicles in this city, having 19 electric wagons of 2000 lb. capacity each. The Larkin Soap Company has three Packard gasoline trucks of 3000 lb. capacity each, which are used for city delivery work, and a heavy electric truck, with a capacity of 2.5 tons, used for freight work. The Hard Manufacturing Company uses a Vehicle Equipment Company's two-ton electric truck which does the work of three teams hauling heavy hardware. The Keystone Transfer Company uses a Packard truck for its general carting and express work.

The manufacturing end of the automobile business is still in its infancy so far as Cincinnati is concerned. There is not one company here which devotes its entire time to the manufacture of automobiles. Several firms in connection with operations in other lines, such as carriage manufacturing, etc., construct machines, but no special effort, apparently, is made to secure orders.

Continuous service in the city of Chicago is a rather severe test of a commercial vehicle, for though there are few grades of any severity, many of the city streets are paved with cobblestones or are filled with chuck holes and make exceedingly rough riding, and the roads in the outlying portions of the city are mostly very poor, especially in wet weather. The streets that are asphalted are forbidden to heavy traffic. The firms of Montgomery Ward & Co. and Lyon & Healy, both users of motor trucks, are located in the business center of Chicago and their trucks make trips in all directions, the former finding most of its work within a radius of a few miles of the center of the city and the latter reaching out to a distance of from 20 to 35 miles or even slightly more, so that all kinds of roads, mostly bad, are encountered.

Boston, as a market for the commercial vehicle, has had a peculiar history, and on account of the early incidents of this end of the business is now perhaps somewhat behind other cities. When the business was young there was a tremendous boom in the commercial vehicle in Boston. A large company was formed to handle electric delivery wagons and it established also a cab service. Contracts were made with a number of the leading firms of the city for motor vehicle delivery and wagons of this sort were common on Boston's streets when they were almost unknown in many other places. One large department store abandoned its horse delivery wagons and took up the electrics; others followed suit in part, and cabs were common. Then came the crash. The company was ahead of its constituency. It developed a service which the public was not well enough acquainted with properly to support. This fact and mistakes in management made it impossible for the company to go on, and the whole service went to pieces, while the investors in the enterprise lost.

Though Albany is a city of hills and the few demonstrations of the commercial vehicle have shown that two loads can be carried on it over any given route to one of the old horse truck, yet there has been no general purchase of such vehicles. There are four concerns, the Union Laundry, Babbitt & Co. (clothing), Steefel Bros. (clothing), and W. M. Whitney & Co. (department store), now using motor delivery wagons and finding them satisfactory.

The Kansas City Motor Company, in which a number of local business men hold stock, has the largest number of commercial cars of any make on the streets. Emery Bird Thayer Company is using one of the two-cylinder cars. So are the Jones Dry Goods Company, C. A. Schaeffer, florist, Fred Wolferman, grocer, all located in the retail district downtown. A large truck is under way for the Central Ice Company. Hauling most of the baggage of Kansas City is the work of the Depot Carriage and Baggage Company, which last year bought some Ramblers for livery service, and this year is selling the Lambert. From pleasure vehicles to the more severe tests of business was only a step for their cars.

Brief Notes of the Electric Vehicle Field

Electrics Used in Many Different Lines

THE electric vehicle has reached a point of perfection where all that is sought by its maker is to get the public better acquainted with it, says Arthur Williams, general inspector of the New York Edison Company. There need be uncertainty no longer concerning its ability, for it has years of service and enviously good records to back it. In New York city there are nearly 150 firms using anywhere from one to 100 electric vehicles. Some of these concerns have had their electric wagons more than 10 years, and they are, one and all, ardent advocates of the electric method of transportation.

Probably the oldest electric vehicle service operating to-day is that of Altman & Co., in New York City. Following this came the installation of Tiffany & Co. At first only three vehicles were purchased—this was about nine or 10 years ago—but immediately they proved so successful that 18 more were added, making a total of 21 electric vehicles in all. These machines are all in operation to-day and are noted for their fine appearance, their cleanliness as well as their efficiency.

Owing to the absence of the fire risk with these electrics, the Tiffany system of delivery provides for the loading and unloading of the cars on any floor of their great Fifth avenue store by means of a large vehicle elevator.

What is said to be the second largest outfit of electrics in the world is that operated by Gimbel Brothers, of New York, for delivery of dry goods and furniture from their store. This consists of more than 80 electrics, chiefly of the Studebaker type and some Lansden wagons.

The wholesale dry goods house of H. B. Claflin Co. should be placed among the first purchasers of electric trucks, for their earliest installation was made more than 10 years ago, and the machines purchased then are still giving regular service, rain or shine, around the city. This company has used trucks of the 3.5-ton size for heavy freight.

The electric service of Macy & Co. now includes more than 35 machines. This branch is always on duty. Snow and ice are never allowed to keep the machines in the garage. A set of wheel chains, a bucket of gravel and a good snow shovel are on each vehicle during the winter months, and, as a result, the machines are enabled to travel on any kind of winter roads.

A large Brooklyn house which is fast developing electric delivery is Frederick Loeser & Co. This concern has about 20 electrics. The half-ton delivery wagon type is used on their shorter routes and special deliveries, one-ton delivery wagons on the regular or longer routes, while for their transfer work between the store in Brooklyn and their suburban transfer stations at Parkville three three-ton trucks are used. These people have had five years' experience with electric vehicles and believe that they are unequaled within their scope of action.

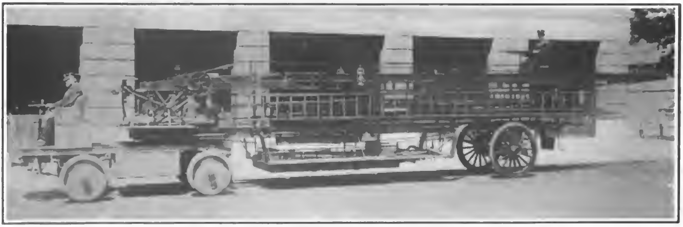
Probably one of the greatest victories ever won by the electric vehicle in the delivery field is the decision of the Greenhut-Siegel Cooper Company, for after a three years' test of motor wagons it adopted the electric, placing an order for a large number of one-ton delivery wagons and three three-ton transfer trucks.

Electric Baggage Truck Tried in Kansas City

At the Union Depot in Kansas City an electric baggage truck is now being tried out. This is similar to the form which is used in the big terminal stations in New York, Philadelphia and Washington, having a platform at one end on which the operator stands to control the movements of the vehicle. The experiment is being conducted by J. V. Hanna, chief engineer. The truck has a capacity of 4,000 pounds, or 30 trunks of the average size. The baggage handlers are said to be very much in favor of it.

Youngstown Firm Will Build Electrics

A dispatch from Youngstown, O., states that the Youngstown Electrical Garage Company, of that city,



Couple-Gear Tractor Hauling Ladder Wagon in Springfield, Mass. This is the Latest Form in Which Tractor Can Turn at a Big Angle

Beaver 3000-Pound Truck in Service of Portland Store

composed of A. F. Clauss and F. McVean, has completed the first electric truck ever built in that city. This has a capacity of 1,000 pounds and a number of the same size wll be built immediately. According to Mr. Clauss four or five orders have already been booked and the company will soon move into large quarters. The truck looks good, and a mileage of 65 miles with one charging is claimed. The price has not been fully decided upon, but will probably be something under $1,500. The new truck is capable of a speed of 15 miles an hour.

Beaver Electric Western Newcomer

Out on the Pacific Coast, at Portland, Ore., a new firm has just been organized to build and sell both gasoline and electric commercial cars. This is the Beaver Motor Truck Company, headed by W. E. Dorman an old automobile and commercial car man. He has had a number of years' experience, mostly in southern California, where he was located for a long time. Moving north into Oregon, he has gathered together a group of strong financial backers and has organized this company. A small shop with a most complete equipment has been obtained where the present work is being carried on, but as soon as business warrants its, a larger place is in view.

Mr. Dorman, who has been East for the big shows, states that conditions on the Coast are excellent for the motor truck. All through the stations of California, Oregon and Washington, the fruit growers and ranchers are buying commercial cars. To an Eastern man, with no knowledge of Western conditions, the number of cars in use there is astounding. It is said that there are nearly 2100 in California, of which Los Angeles and vicinity have almost 800. In addition, San Francisco is credited with almost 300, Portland with 400, Tacoma with 125, Seattle with 150, and many smaller cities, almost unknown in the East with more than 75 each.

In the February issue, in this department, the firm's 1500-pound wagon in the service of the Meyer & Frank department store was shown but erroneously labeled a new Denver product. This concern has never been in the Colorado city and does not expect to change.

Ship Electric Truck to Melbourne, Australia

The Walker Vehicle Company of Chicago, which is the new name for the original Walker Balance Gear Company of the same city, has recently shipped the first electric vehicle to Melbourne, Australia. A number of additional orders have been received, all these being of special design. Ernest Lunn, vice-president of the company, who was formerly connected with the Chicago Commonwealth Edison Company, says, speaking of this order: "The day of the truck is just beginning, big business houses and corporations are waking to the fact that there are other automobiles than those used for pleasure. At present it is practically impossible to purchase a first-class team for less than $1,000. And the team and wagon cannot do one-third the work of an ordinary truck while cost of keeping them is increasing constantly.

Washington Electric Car in Trouble

The creditors of the Washington Motor Vehicle Company, with claims aggregating $1,139, recently filed a petition in the district supreme court asking that the concern be adjudged a bankrupt. At that time the allegation was made that the officers of the company admitted the insolvency on Jan. 15 last. The concern made the Washington electric pleasure and commercial cars, specifications of the latter having been presented in the February issue.

Detroit Electric Trouble Wagon in Service of Kansas City Electric Light Company, Showing Equipment

Methods of Commercial Service Stations

How Alvan T. Fuller Handles the Packard Trucks in His Territory With Mention of the Business Principles and Blank Forms Used

C. F. MARDEN

ALVAN T. FULLER, rated by many as the most successful motor vehicle dealer in New England, has represented the Packard since 1903, and he has built up his large business, which, besides the Boston headquarters, includes branches in Providence, R. I.; Worcester and Fall River, Mass., and Portland, Me., upon the plan of satisfying his customers. To do this he has developed a system that includes a large corps of trained experts in selling and service, and in each sub-division of these two main departments. And he has erected a building on Commonwealth avenue in the Brighton section of Boston that is devoted exclusively to Packard service. The building is of factory proportions, 70 by 352 feet, with four stories and basement, built of reinforced concrete faced with brick and equipped in every particular to give to Packard car and truck owners that service which Mr. Fuller considers an indispensable requisite to his success.

When the truck business came along Mr. Fuller applied to it the same methods, altered only to suit the different requirements of commercial vehicles that had worked successfully with passenger cars. He aims to make every truck that he sells give tô its owner at all

Technical Department of Fuller's Establishment, Showing the Space Given to This Very Important Branch. Insert—Exterior View of Commonwealth Avenue Front times the maximum of results at the minimum of cost, continuous good service being his idea of what a customer has a right to expect from a Packard truck purchased of the Boston agent.

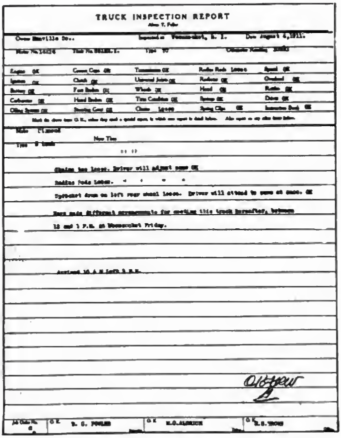
In the Fuller organization there is a distinct truck department headed by Frederick C. Graves, who has under his direction a force of four salesmen, half a dozen drivers for demonstration and instruction purposes, and two inspectors. The truck department works in co-operation with the technical department, headed by I. C. Boles, and this department handles everything in the way of the care and maintenance of trucks as well as of passenger cars. The Fuller organization does not comprehend a garage for customers' cars, the building being devoted exclusively to sales and service, with such garage accommodations as are required for the agency's equipment of vehicles.

A business man having agreed to purchase a truck after such arguments as the salesmen are able to bring to bear as a result of their investigation of his particular needs, and a demonstration, if one is required, the truck is delivered. With it for the first few days, perhaps four or five, is a driver from the Fuller plant, who instructs the man to handle the truck, teaching him the details of operation and care, lubrication and adjustment.

The interest of the dealer does not stop there, however, for every week thereafter at some time and place prearranged an inspector appears and with the driver goes over the truck. For this service there is no charge to the owner. The inspector shows the driver how to make the slight adjustments that may be needed, and recommends changes in methods that in his opinion will bring about the most economical operation and the best all-around results. After each inspection the inspector makes out a report, as shown in the illustration, Fig. 1.

One copy goes to the owner of the truck, one to the manager of the sales department and the third to the technical department. This inspection system is found to be particularly efficient in keeping the trucks from lubrication troubles. The inspectors find that the drivers, often working long hours trucking and besides being required to care for the truck, neglect this latter part of their duty by giving the mechanism insufficient lubrication. The weekly inspection, however, as a rule, prevents trouble and drills into the driver the fact that oil is essential. In this way many a serious trouble is averted.

Where the Trucks Are Received, Examined and the Work Ticket Made Out for Necessary Repairs. Insert—Aisle in the Stock Room Where $200,000 Worth of Parts is Carried



TRUCK INSPECTION REPORT

Chains too loose. Driver will adjust same OK

Radius rods loose. " " " "

Sprocket drum on left rear wheel loose. Driver will attend to same at once. OK

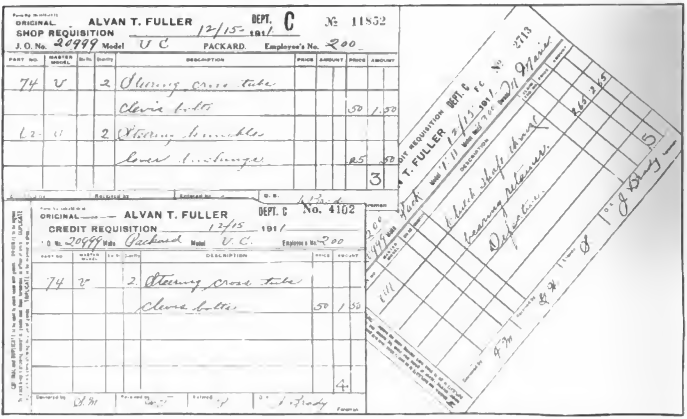
Have made different arrangements for meeting this truck hereafter, between 12 and 1 P.M. at Woonsocket Friday.

Fig. 1—Truck Inspection Report Made After Going Over the Vehicle, and Indicating Its Exact Condition, Recommendations Made and Work Done. The Thoroughness of Both the Inspection and Work Done May Be Noted Since This One Is Filled Out

It is inevitable that, despite weekly inspections, parts will become worn in hard service and repairs or replacements will become necessary. These the inspectors cannot prevent; what they do prevent, however, is the development of slight ills to such proportions that they will be expensive to cure. When the inspector sees that a repair is advisable or necessary his finding is immediately reported to the owner. The latter may send the truck to any repair shop he elects or he may send it to the Fuller building, which is the course pursued by most of the local owners.

When a truck comes to the Fuller building for a repair it is admitted to the street floor, where a doorman gives a receipt for the truck and calls the proper employee to make an examination along with the owner or driver. At this point the work to be done is agreed upon, and if possible an estimate of the cost given. If the examination shows other work than that contemplated by the owner as desirable the owner is notified and he decides whether it shall be done or not. The examiner makes out a card like that of Fig. 2 and upon it is listed the number of the job, details about the truck and the work that is to be done. One copy of this card goes direct to the technical department, a second to the accounting department and the original on thick cardboard is inclosed in a pocket or case, made of heavy imitation leather material with a celluloid face and attached to the truck. The case protects the card, keeps it clean and prevents it from being lost. Through the celluloid the workmen or foreman can examine it without taking it off, as shown on opposite page.

The truck is then taken by a large elevator to the top floor of the building, which is the shop, only minor



ORIGINAL ALVAN T. FULLER DEPT. C № 11852
SHOP REQUISITION 12/15 1911
J. O. No. 20999 Model U C PACKARD. Employee's No. 200

PART NO.	MASTER MODEL		QUANTITY	DESCRIPTION	PRICE	AMOUNT	PRICE	AMOUNT
74	V		2	Steering cross tube				
				clevis bolts			.50	1.50
62	V		2	Steering knuckles				
				lower bushings			.25	.50

3

ORIGINAL ALVAN T. FULLER DEPT. C No. 4102
CREDIT REQUISITION 12/15 1911
J. O. No. 20999 Make Packard Model V. C. Employee's No. 200

PART NO.	MASTER MODEL		QUANTITY	DESCRIPTION	PRICE	AMOUNT
74	V		2	Steering cross tube		
				clevis bolts	.50	1.50

4

Delivered by
O. K. J. Brady Foreman

CREDIT REQUISITION DEPT. C № 2713
T. FULLER 12/15 1911
20999 Make Packard Employee's No. 200

Clutch shaft thrust bearing releaser Defective 2.65 2.65

5

O. K. J. Brady

Fig. 3—Duplicate of the Shop Requisition for Parts and Charges for the Same. Fig. 4—Form of Credit Slip Used to Acknowledge Receipt of Parts, Made Out In Triplicate. Fig. 5—Credit for Parts Requisitioned and Not Used

repairs, such as adjustments of the magneto or carburetor, being made on the street floor. Experts in this work are on hand to make such adjustments with the least possible delay. The shop, which takes in the whole top floor without a post or other obstruction, is lighted on both sides and from the roof. Arriving there, the truck is assigned a place and the foreman directs the workmen what to do, giving each a small card upon which his particular duties are written out. The workman puts his card in a little case which he has always with him, takes it to the office of the shop, gets his time through a time clock and starts on his job. When he stops he gets his time again, so that a complete record is kept of the number of hours expended on any job. This is not only for the purposes of charging and accounting, but so that the owner, if he desires, may see how many hours or minutes workmen were engaged on his truck. This system has proved most effacious in satisfying customers.

To obtain the tools he needs the mechanic presents brass checks bearing his number to the tool room and he must return or account for these tools. He also gets some small parts at the tool room, but for these he has to have a requisition. For the larger parts the requisition, Fig. 3, goes to the stock room on the second floor. In this room Mr. Fuller carries a $200,000 stock of all parts which may be needed for work on any model of Packard car or truck. Parts are delivered from the stock room to the work room by an electric dumb waiter. Everything is handled by number. After a mechanic has done what the ticket calls for the job is examined by the foreman and the original slip O. K.'d as to that particular item. Parts requisitioned and not used are returned and a slip, Fig. 4, is made out in triplicate, one for the accounting department, one for the stock room foreman and one for the shop foreman. In case material is returned to the Packard factory a slip, Fig. 5, is used. By means of these slips the office has a full record of all the time and material that is employed on every job and all credits. With the job finished the original card punched by the shop foreman goes to the accounting department and the truck is sent to the testing department, which is not a subdivision of the shop, but is directly attached to the technical department. The tester tries out the truck and if everything appears to be all right delivers the truck with his report to an inspector, who in turn goes over every detail. Upon his O. K. the truck is ready for its owner. The tester and the inspector are encouraged to be keen in finding fault with the job wherever there is a chance for a reasonable complaint, it being Mr. Fuller's desire that no

Fig. 2—Examiner's Card for Truck to Be Repaired, Including Work Recommended and Agreed to by the Owner, Shown in the Leather Case Used to Protect It from Abuse. The Blank Is Made Out in Triplicate

truck shall leave the station after repair unless it is capable of doing all the work it should and perhaps a little more than its rating calls for.

In addition to the receiving floor where vehicles are received and examined in the beginning and examined and delivered at the end of a transaction and the shop, the two other floors and basement are completely occupied. The front of the first and second floors is the Fuller sales room, a mezzanine floor being occupied by the accounting department. The technical division has a large office off the salesroom and convenient to the first shop floor. A part of the second floor is occupied by the stockroom and a storage-room for inclosed bodies, in summer and touring bodies in winter, many Packard car owners shifting the bodies in spring and fall and keeping them at the Fuller building. In the basement is the oil room with large tanks from which oil is piped to the other floors where it is used. Here also is the garage for the agency's demonstrating and service cars. An interesting feature of the stock room is the supply of spare truck wheels with tires attached, which, in case of tire or wheel trouble to a customer's truck, can be hurried to the point where the trouble occurred in a service wagon, and the delay reduced to a minimum. On the third floor are the inspection and upholstery departments, top shop and large paint room, all of which are devoted to truck as well as passenger car work.

The Fuller building, while out of the congested business center of the city, is located on one of the finest boulevards in the city and in the district to which the motor vehicle business is moving rapidly. It is within easy reach of down-town and also practically on the main thoroughfares to the suburbs so that it can be reached easily by truck owners and drivers. The building faces on three streets and on the other side has spacious grounds, which now are largely lawn, but which it takes no very great foresight to see covered with another building similar to that now in place. It would not be surprising if the second building were exclusively a truck service station.

Vehicle Cost Investigations in Boston

BOSTON, Feb. 20.—H. M. Thomson, an instructor in the electrical engineering department of the Massachusetts Institute of Technology, who is making an investigation into the relative economy and efficiency of horse and motor methods of handling merchandise, was the interesting speaker at the recent meeting of the New England section of the Electric Vehicle Association at Hotel Thorndike. E. S. Mansfield presided, and, in addition to Mr. Thomson's, addresses were made by Chester I. Campbell, manager of the Boston motor car and truck shows, and by H. W. Moses of the Edison company, who is working on the electrical show to be held here next fall.

Mr. Thomson's investigations cover about a score of users of motor trucks and horse-drawn vehicles in Boston and vicinity, and between 30 and 35 concerns outside of Boston. He told his auditors that the upkeep of a one-horse truck is approximately $1191 a year, of a two-horse truck $1800 a year, of a three-ton gasoline truck $3900 a year and of a five-ton gasoline truck $6500 a year. His figures on electric trucks had not been put in such shape that he could announce them. Comparing the cost a ton between horse-drawn and motor vehicles his figures showed $1.05 a ton for the motor against $1.70 for the horse. The average speed of the horse-drawn vehicle is 2.6 miles an hour and of gasoline trucks 15 miles, though he felt that the economic speed of a motor truck should be about 10 miles.

The advantage of the motor truck he had observed also in loading and unloading. From experience in one of the local freight terminals he found that the motor trucks were much quicker in getting into place and discharging their loads than the horse-drawn wagons. This he considered an important point for the motor.

STEEL CUSHION WHEEL OF MERIT

In the illustration herewith is shown a view taken in the shop of a New York company which is now manufacturing a line of steel surface cushion wheels for both pleasure and commercial cars. The illustration shows a number of the various sizes, those in the immediate foreground being for truck use while the one at the right is a pleasure car wheel. Aside from what might be said of the great thickness of the tire portion, these wheels when finished resemble any other automobile member very materially.

For truck use these have a great advantage in that the steel shoes have a life of from 50,000 to 60,000 miles or even more as compared with a maximum of 4000 or 5000 on pneumatic tires and perhaps twice that on the best solids. The tire referred to is the Ellis, the invention of Axel E. Ellis, the product being marketed under the name of the Steel Cushion Tire Company. Space prevents a complete description of this very interesting accessory, but in a later issue the complete details will be given, as well as a description of the factory.

Steel Cushion Wheels for Both Pleasure and Commercial Car Use

Commercial Motor Vehicle Patents

Motor-Driven Steering Axle

UNDER a number of conditions, it is highly desirable to drive with all four wheels. This requires that one pair of them, the fronts, must steer as well as drive, and necessitates a special construction. The figure below shows the invention of the Hatfields along this line, theirs being a double chain drive form. In this, the motor operates a central jackshaft, from which four enclosed chains proceed to the respective wheels. The patent calls for a pivotal connection with the frame for steering a ball shaped member on the axle.

1,012,847, issued to C. B. Hatfield and C. B. Hatfield, Jr., Cornwall-on-the-Hudson, Dec. 26, 1911.

A Form of Four-Wheel Drive

In the Gray patent, which is but one of several taken out at the same time, the inventor had in mind a front as well as a rear drive. This includes, however, a form of mechanism by which a pair of wheels on one side may be driven at a different speed than the pair on the other side. This could be effected only by eliminating the differential, as otherwise the single drive from transmission to each axle would give the same speed to both wheels, except on curves. The inventor seems to have had in mind a belt method of changing and transmitting speed.

1,012,841, issued to B. S. Gray, executor of S. B. Gray, deceased, Jacksonville, Ill., Dec. 26, 1911.

Resilient Tire on New Principle

The wide appreciation of the benefits to be derived from a correct and usable resilient form of tire have induced many to work upon variations of this. In the type evolved by Duncan and shown herewith, a modification of the block tire is used, each one of the biscuits having a hollow interior which would provide considerable resiliency as well as having the feature of individual removals. The side walls are of sufficient thickness to withstand the load placed upon them, at the same time being thin enough to be very yielding and resilient. It is upon this proportion that the action depends.

1,013,282, issued to Hugh Duncan, Langside, Glasgow, Scotland, Jan. 2, 1912.

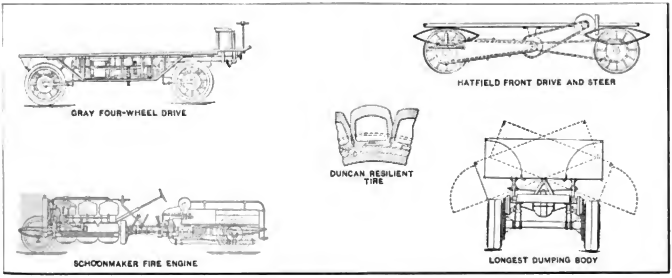
Schoonmaker's Fire Engine

This is a combination patent, including an engine, driving shaft, clutch and other parts. The important members are a secondary driving shaft for operating the pump, placed amidships, this being thrown into and out of operation by means of a slidable gear which engages with another on the driving shaft.

1,013,622, issued to James M. Schoonmaker, Jr., Pittsburgh, Jan. 2, 1912.

Unit Compartment Dumping Body

Within the year, all forms of quick loading or unloading bodies have been given much attention with the growing realization of their influence upon the efficiency and economy of the vehicle to which they are fitted. Not only body builders and users have worked on this, but also truck makers. The sketch shows a product of one of the latter, a comparative newcomer in the commercial field in the Middle West and South. As the drawing reveals, the body is arranged to tip to either side with extra small chutes for the actual delivery. It may be noted that the name of this company is the Longest Brothers Company, not Longest Brothers as indicated in the February issue. 1,013,789, issued to William B. Longest, Louisville, Jan. 2, 1912.



GRAY FOUR-WHEEL DRIVE

HATFIELD FRONT DRIVE AND STEER

DUNCAN RESILIENT TIRE

SCHOONMAKER FIRE ENGINE

LONGEST DUMPING BODY

The Latest Patents of Interest to the Commercial Motor Vehicle Industry, Showing New Forms of Drive, Fire Engine, Tire and Body Dumping Mechanism

Of Interest to the Motor Wagon Industry

With the Agents and Dealers

THE Whitney-Barney Company of Boston is a new firm which recently opened. This firm is located at 823 Boylston street, and is handling Gramm commercial vehicles.

W. W. Barnett, 28 W. Colfax avenue, Denver, has taken the agency for the Federal truck.

The Felker Auto Company, Denver, has taken on the Sampson truck agency for Col., Wyo. and N. Mex.

R. S. Mattoon, Chicago, has taken the agency for the Indiana truck, manufactured by the Harwood-Barley Mfg. Co.

Vautrot Brothers, Durand, Wis., have taken the agency for Ford cars, pleasure and commercial, and have opened a salesroom and garage.

The Kerosene Gas Producer Company has opened an office at 1926 Broadway, New York City, where the business of the Universal Oil Converter Company will be conducted.

Schildwachter Carriage Company at Park avenue and 128th street, New York City, has taken the Sternberg agency and will maintain a service garage and carry a complete line of all parts.

C. P. Root, of Portland, Ore, manager of the Michigan Motors Company of that city, has secured the Northwest agency for the Lippard-Stewart light delivery wagon.

G. E. Holmes and A. B. Curry, St. Paul, have formed the Veerac Sales Company and have taken the agency for the Veerac light trucks. A garage has been secured at 1790 University avenue, St. Paul.

The Milwaukee sales department of the Brodesser Motor Truck Company, Juneau, Wis., has taken over the sales of Menominee commercial cars, made by the D. F. Poyer Company, Menominee, Mich.

The Findeisen & Kropf Mfg. Co. of Chicago has recently added to the list of distributors the following dealers: Ballou & Wright, Portland, Ore., Browne & Leacy, Pittsburgh, Joseph Woodwell Company.

An office, stock and show room has recently been opened by the Connecticut Telephone & Electric Co. at 231 West 54th street. A complete and well assorted emergency stock of Connecticut ignition devices, shock absorbers and fittings is carried on hand.

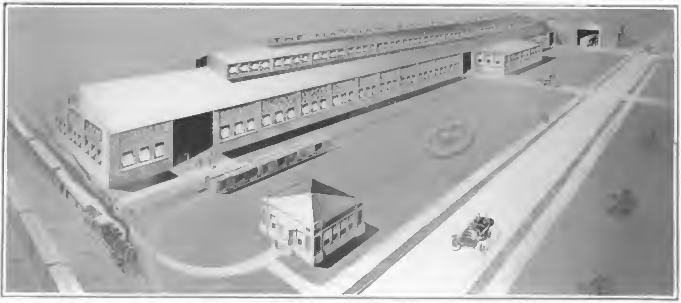
Everett Morgan of the Morgan-Bond Company, Minneapolis agent for Stegeman trucks, has closed a deal with the Stegeman factory for six additional trucks, to be used in a transfer service between the Twin Cities. The firm will continue to act as selling agents for the trucks, as well as looking after the transfer business.

The Goodyear Tire & Rubber Company under the direction of C. W. Martin, Jr., district manager in the Southern States, for 1911 has shown a remarkable growth in the number of branches which have been established in this territory. Five have been opened under Mr. Martin's supervision, located to handle the large volume of Southern business.

The Chase Motor Truck Sales Company, of Minneapolis, has taken the agency of the vehicles made by the Chase Motor Truck Company, Syracuse, N. Y. This new agency gets an unusually attractive territory, which includes nearly the entire state of Minnesota, also North and South Dakota and a small portion of Wisconsin.

The Sterling Place Garage and Sales Company, 788-796 Sterling place, Brooklyn, has just been appointed dealer for the Lippard-Stewart commercial cars. The garage company has one of the largest garages in the city of Brooklyn, containing 22,000 square feet of space, and will have the Long Island territory. The officers of the company are: W. H. Perrine, president; A. Stevane, vice-president; R. D. Perrine, secretary and treasurer.

The Havoline Oil Company of 17 Battery place, New York City, has announced the following new agents: W. A. B. Worley of Jacksonville, for the Florida territory; Augusta Overland Motor Car Company of Augusta, Ga.,



Birdseye View of the Large and Commodious Factory of the Mather Spring Company, Toledo

The Mack Factory of the International Motor Company Located at Allentown, Pa.

for the territory included in Lincoln, Columbia, Richmond, Warren, Jefferson, Glassock, Washington and Jenkins counties, Georgia, and Edgefield, Aiken and Barnwell counties in South Carolina; the Euclid Oil Company, 1906 Euclid avenue, Cleveland, for the territory included in northeastern Ohio, Cleveland, Akron and Youngstown, and the James Gray Kuhn Company, 5712 Penn avenue, Pittsburgh, for the territory within a radius of 60 miles from Pittsburgh

Factory Additions and Enlargements

The Automobile Supply Manufacturing Company, of Brooklyn, has prepared papers to increase the capital stock to $500,000, fully paid in.

The Republic Rubber Company at Youngstown, O., is having built what is to be one of the finest and most thoroughly up-to-date buildings of its kind in the world. This will be called the Calendar building.

The Reliance Fire Company, of Wilmington, has contracted with a new concern formed here for the manufacture of fire engines, with James J. English and John T. Lally, at its head, for an automobile combination engine. The company already has a Webb motor.

The Philadelphia Storage Battery Company has opened a new office in the American Building, Broadway and Columbus Circle, New York City, in order to facilitate the handling of its increasing business in electric vehicle and other types of batteries used in the automobile trade. The new office is in charge of Walter L. Thompson.

The J. I. Case Threshing Machine Company, Racine, Wis., has increased its capital stock from $5,000,000 to $40,000,000. The additional money will be used to take care of the great expansion in the company's business, permit large factory extensions, and an entrance into the commercial vehicle business.

Business Troubles and Embarrassments

A decision handed down by the United States Circuit Court of Appeals, recently, marks the end of long litigation which the Weed Chain Tire Grip Company, of New York city, has conducted throughout the country against manufacturers of various devices claimed by the Weed company to be infringements of its patent, which the court held to be valid. In the suit of this concern against the Atlas Chain Company, Judge Lacomté granted a temporary injunction against further manufacture of chain grips.

Holley Brothers Company, Detroit, manufacturers of Holley carburetors, desire it to be known that the patent litigation in which they have been involved

General Appearance of the Saurer Plant of the International Motor Company in Plainfield, N. J.

by Adolph Saurer pertains only to an alleged infringement of the Saurer double-jet carburetor patent. Carburetors of the double-jet type have not been built by Holley Brothers Company since early in 1911.

The Interstate Commerce Commission recently announced a decision in the case of the Auto Vehicle Company against the Chicago, Milwaukee & St. Paul and other railroads. It has been ordered that the first class rate for transportation of metal motor vehicle parts in carload lots from Milwaukee, Wis., to Los Angeles, Cal., should not be enforced and that instead for the future the railroads must apply the fourth class rate to such shipments.

The Champion Wagon Company, Owego, N. Y., on the 25th day of November last, suspended manufacturing operations on account of financial difficulties. Immediately thereafter a movement was instituted, having in view the organization of the company upon a solvent basis, and a meeting of creditors and stockholders was called. Numerous conferences had been held attempting to formulate plans and devise ways and means for the reorganization. Having in mind the best interest of all concerned, creditors of the company petitioned George W. Ray, Judge of the United States District and Circuit Courts of the Northern District of New York, for receivers, and he thereupon appointed Fred C. Hill and Theodore D. Gere, both of Owego, N. Y., receivers in bankruptcy of the company, with power to continue the business under the direction of the court.

W. H. Moore, Manager Sales Dept., Gramm Motor Truck Co.

Recent Truck Incorporations

Taxi Service and Baggage Corporation, Baltimore; capital $150,000. Incorporators: W. L. Lamberdin, A. P. Thom, Jr.

The Greenpoint Taxicab Company of Brooklyn, capital $10,000. Incorporators: Chas. W. Hoppins, Chas. E. Keller and Samuel K. Keldon.

The Columbia Garage Company of New York City, capital $1000. Incorporators: Harry S. Lyons, V. G. Bogardus and Geo. S. Aufrecht.

The St. Nicholas Garage & Taxicab Company of New York City, capital $10,000. Incorporators: Dennis Rohan, Geo. J. Wider and Henry Henrich.

The Rimach Wheel Company, Inc., of New York City, capital $500. Incorporators: Chas. S. MacKenzie, Herman E. S. Chayes and Walter F. Wood.

Available Truck Company, Chicago, to manufacture and deal in trucks, capital $25,000. Incorporators, E. F. King, A. H. Wiedhafft and R. C. Blume.

Geo. Breuning, Barlow & Company, Inc., of New York City, capital $5000. Incorporators: Geo. J. Breuning, Abraham L. Barlow, Louisa Breuning.

Motor Truck Body Company, Detroit, to make truck bodies and parts, capital $10,000. Incorporators, E. T. Hangsterfer, F. G. Proctor and E. F. Rauss.

The H & B Auto Sales Company of 1733 Broadway, New York City, capital $5000. Incorporators: Chas. G. Heywang, Geo. J. Burger and Stewart H. Jones.

The Hatfield Auto Truck Company of Elmira, N. Y., capital $1,500,000. Incorporators: David H. McConnel, Alexander D. Henderson and Arthur S. Hoyt.

The Kansas City-Auburn Company, Auburn, Ind., capital $10,000, to deal in motor trucks. Directors: Charles Eckhart, F. E. Eckhart and Morris Eckhart.

Speedwell Motor Truck and Service Co., New York City, to sell and care for trucks, capital $50,000. Incorporators, G. A. Pendreigh, J. Freidman and J. B. Unicake.

Krebs Commercial Car Company, Clyde, O., to manufacture and sell trucks, capital $100,000. Incorporators, J. C. L. Krebs, R. A. Becker, F. X. Bachle, H. Metzger and G. Slessman.

The Hermitage Auto Livery Company, capital $10,000, was filed at the office of West Morton, register, recently. The incorporators are L. W. Jacobs, W. F. Jacobs, E. L. Holt, H. T. Allison and S. Stokes.

Brief Personal Mention

H. F. Vortkamp was recently made general manager of the Candler Radiator Company, Detroit.

C. A. Bayley has charge of the Chicago branch of the Weston-Mott Company, located at 903 Marquette Building.

R. H. White, First Vice-President, The White Company

J. M. Ward of the Waverley Company has been appointed to succeed P. P. Willis as secretary of Indiana Auto Association.

H. S. Stebbins, of the General Motors Truck Company, has been moved to New York city, where he will assume the position of Eastern district manager.

J. E. Baker has been placed in charge of the recently opened salesroom of the General Motors Truck Company in Boston.

J. K. McKeough has accepted a position with the Velie Chicago branch in the truck department. He has been interested in this industry for the past year or two.

D. B. Arthur has taken charge of the commercial car department of the Ohio Motor Car Company. He has been representing these vehicles on the Coast for several years.

W. E. Dorman, engineer and manager of the Beaver Motor Truck Company of Portland, Ore., has returned from a trip East, attending the shows. While East he arranged for material to increase the output of his factory.

J. F. Gfrorer has been appointed in charge of the service department of the American Locomotive Company.

Fred J. Titus, for the past year selling Alcos at retail, is now associated with the wholesale department. He will assist in establishing agencies.

George D. Grant has declined another term as president of the Detroit Automobile Dealers' Association and will retire at the end of his term, April first.

H. S. Houpt, Manager of Sales, American Locomotive Co.

The automobile engineering business conducted by Fletcher & Anglada at 50 Church street, New York City, was dissolved on Feb. 1st, 1912. Mr. Anglada will continue the business in his own name and at the same address. Mr. Fletcher has retired from the partnership and will devote his time exclusively to the interests of the Walter Motor Truck Company.

Charles H. Dahlquist has been engaged by the Lippard-Stewart Motor Car Company of Buffalo as assistant chief engineer. For two years past Mr. Dahlquist has been engaged with the International Harvester Company at Akron, O., and as chief engineer of the Harvester Company's automobile business. Previous to that he was chief engineer of the Velie company for one year.

C. H. Wallerich, general sales manager of the Mais Motor Truck Company, has tendered his resignation which became effective Feb. 1st. It is understood that he has accepted the position of manager of the automobile department in the newly organized General Industrial & Manufacturing Co.

Recent Trade Printed Matter

A catalogue on automobile tire repair equipment is being sent out by the Williams Foundry & Machine Co. of Akron, O.

The Heald Machine Company of Worcester, Mass., is sending out a catalogue on Oversize Standards for Pistons and Rings.

A very beautiful booklet is being sent out by the Booth Demountable Rim Company showing different styles of demountable rims for vehicles.

Robinson-Loomis Motor Truck Company of Minneapolis has issued a catalogue showing several styles of motor trucks for everyday hard service.

A booklet entitled "Commercial Car Tires" is being sent out by the Motz Tire & Rubber Co., Akron, O., showing different styles of their solid and cushion tires.

H. D. Smith & Company of Plantsville, Conn., has recently issued a good sized catalogue showing the Perfect Handle and Sharpen Ezy tools. This also shows the vehicle drop forgings.

Miscellaneous Notes of the Industry

Eugene, Ore., has ordered a combination chemical and hose wagon with ladders to cost $7,920.

The Hamilton Automobile Transfer Company, Lisbon, O., has been sold by the Hamilton Brothers to Clarence C. Smith.

Mayor Joseph Versailles of East Montreal has instituted motor bus service between his municipality and Montreal proper.

Eau Claire, Wis., is considering the purchase of three fire trucks. The committee in charge of this proposition is headed by Mayor J. T. Fleming.

Mayor Goodman of Racine, Wis., has sent a message to the common council urging the immediate purchase of three motor fire engines to replace all horse-drawn steamers.

The Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., has replaced with motor cars 12 of its mules. These formerly worked in mine 2. Other installations will follow, it is said.

The Lawn Croft Cemetery Company, Wilmington, finds such a demand for a funeral car, which it has had in service several months, that it is probable an additional one will be necessary shortly. The car will carry 35 persons.

The business of the P. H. P. Motor Truck Co., Westfield, Mass., has been bought by W. S. Magill, G. Osborne and I. P. Miller, of New York City, who will continue the business under the name of the Westfield Motor Truck Co. The present factory building will be altered.

At the dinner given to the foremen and department heads of the Spicer Manufacturing Company of Plainfield, N. J., J. C. Whiteside was the guest of honor. He is engineer of the New York Leather Belting Company of New York City, and gave a most interesting and instructive talk on the manufacturing and usages of belting.

Sixteen Atterbury buses have been purchased by the Twin City Motor Transit Company, which are to be put into service April first. These have cross seats for 16 persons, electric lights, pay-as-you-enter doors, heating facilities and other modern conveniences. The company's offices will be in St. Paul and its garage in Minneapolis.

Mayor Daniel W. Badger and chief engineer John D. Randall, of the fire department at Portsmouth, N. H., have recommended to the city council that it take steps at once to purchase a motor chemical and hose wagon for the better protection of property. It is expected that the city council will act favorably upon the matter at its next meeting.

The Rapid Motor Transit Company of Indianapolis states that it has under consideration establishing a cross town motor bus line in Indianapolis, running through 30th street from College avenue to Riverside Park, a distance of something more than three miles. The company is now operating a successful motor bus line in North Meridian street.

The Firestone Tire & Rubber Co., Akron, O., has added three new heavy service truck tires, thereby increasing the line to six distinct types. They provide a wide range of designs to exactly meet every type of car, size of load and condition of service. The new tires are known as the block, the hard base, channel type and the hard base, European type.

The Warren-Cortland Automobile 'bus line north of Youngstown, has resumed operation and it is likely that another machine will be purchased this Spring.

H. S. Diller, Sales Manager, Lauth-Juergens Motor Car Co.

This line was started two years ago and has been very popular and profitable most of the time. An agitation is now being waged to carry the mail by motor 'bus on all pike roads leading out from Warren, the country seat of Trumbull County, O.

The Police Commissioners of Wilmington have decided to substitute motor patrol wagons for those now drawn by horses, and the contract for the first motor vehicle for the department has been let to the Pierce-Arrow Motor Company. It is to have a capacity for carrying 12 men and is to be delivered as soon as it can be built, which it is expected will be within the next two months.

White Truck Used Abroad to Transport Hanriot Monoplane with Both Speed and Safety

C. W. Squires, Jr., assistant to President P. W. Wagoner of the General Vehicle Company says, "We have had the greatest January in our 10 years' manufacturing experience. From Jan. 1st to Jan. 31st we sold no fewer than 158 trucks, 91 of which were five-ton trucks. With 60 per cent of our 1911 business reorders in January and orders for 75 trucks already in for February, we will have our work cut out for us at the factory."

The Indianapolis Fire Department has received the following motor fire apparatus, which has been placed in service: A squad wagon carrying eight men, 250 feet of chemical hose and a 35-gallon chemical tank, from the Packard Motor Car Company; a combination hose and chemical wagon and a motor pump apparatus from the American La France Engine Company, and a ladder truck from the Mais Motor Truck Company. The latter carries eight men and 130 feet of ladders.

A passenger-carrying 'bus line has been started between Warren, the county seat of Trumbull County, O., and Newton Falls and Cortland, distant respectively six and eight miles, by P. G. Post, of Lorain. He is putting three machines in service and contemplates two trips daily. The cars are of five-passenger capacity.

The Diagonal Block Tire Company of Urbana, O., is marketing a new heavy duty truck tire invented by Albert L. Siegrist, Akron, O. The special feature of this new invention is that every block is independently demountable without interfering with other blocks. This removal feature is accomplished by the use of two U-shaped head bolts running downward through felloe, and a bolt crosswise through downward flange. When all bolts are in place they become a solid mass eliminating the strain from any one particular block.

The Turner Brass Works, Sycamore, Ill., has designed and patented the Hot Blast tubular gasoline torch. It produces an intensely hot blast flame, easily controlled by the gasoline valve, and the construction is such that it can be adapted to a large variety of work. This new torch is about five feet long and made of heavy gauge brass tubing, two inches in diameter, with a powerful burner at one end and gasoline valve and pressure pump at the other end. The long tube contains the gasoline to the burner, and holds three quarts.

The Wilson Line (Wilmington Steamboat Company), operating a line of passenger and freight steamboats between Wilmington and Philadelphia, Pa., has placed an order with the Commercial Truck Company of America, for five three-ton motor trucks, to be used in connection with the delivery service. The trucks are to cost $3,500 each. The company has had an Autocar truck for some time and it has been giving excellent service, but it has been used only in making long hauls, principally to the suburbs, horses and wagons being used for the regular city delivery.

At the request of one of the members of the Society of Automobile Engineers the New Departure Manufacturing Company of Bristol, Conn., has prepared a set of master ring and plug gauges of the straight chamfer type. This set is contained in a velvet-lined mahogany box and consists of six blued rings and an equal number of plugs, all correctly stamped. The latter represent shafts of standard sizes with reference to the bore of ball bearings, and show the various fillets recommended by several bearing manufacturers for use in these sizes of bearings. This set of gauges was presented to the society by the New Departure company.

Memphis, Tenn., at the direction of the Health Department, has inaugurated a motor truck service for handling garbage. One truck of large capacity has been put into commission, and this collects the garbage which is left at nine stations at various points about the city. The carts collect the refuse as heretofore, dumping it at the stations which have been named. The truck makes the rounds of these stations and transports the material to the city incinerator, where it is disposed of. This has not only made the handling of the waste matter less offensive than before, but has saved expense in connection with the long hauls of loaded wagons from parts of the city to the incinerator.

THE COMMERCIAL VEHICLE

EDITORIAL CONTENTS

PAGE

Boston's Commercial Vehicle Show 3
Separate truck show, 260 vehicles exhibited, 57 different makers present. Organizations discuss truck problems.

Trend of the Times in Truck Work—Part III 7
Effects of show circuit on truck sales, and solutions for trade inactivity.

How Chicago's Coal Supply Is Handled—Part II 10
Four divisions of retail coal delivery, obstacles in each to use of motor truck.

Commercial Vehicle Tires in England 17
Exceptional mileage of truck tires, 35,000 or more miles. Reason for same.

Insuring the Commercial Vehicle—Part I 22
Four kinds in force, cost of each, state regulations. The New York situation.

30,000 Trucks in Use 26
This number in active service. Tabulations of distribution by states and cities. Truck values.

Injustice of Tire Guarantees 30
Tire manufacturer presents case for tire interests. Are opposed to present guarantees.

Boston's Electric Service Stations 40
Electric Vehicle Association establishes two model garages. Systems used in them.

Editorials 32
Amortization and Depreciation, Pending Restrictions on Motor Vehicles, Future Shows, Cost of Drivers.

Manufacturers' News 34
Commer in receivership, International buys Hewitt, Willys buys Gramm, Makers discuss standards.

New Vehicles and Accessories 56
Locomobile five-ton truck; Aries seven-ton truck.

Miscellany . . . .
Electric Vehicle Association Meeting—9; Army Commends Trucks—16; Taxicab Extras in London—21; Manufacturers' Stock in Trade—31; The Manchester (Eng.) Show—36; Wilmington Firm Buys Electrics—44; Gotham Store Buys Light Trucks—45; Militaire, Two-wheel Carrier—45; Express Company to Use Trucks—45; Sprinkling Tank Body—45; Tests Gasoline Railway Car—60.

DEPARTMENTS

PAGE
ELECTRIC VEHICLES.................... 38
COMMERCIAL CAR QUESTIONS DISCUSSED. 46
MUNICIPAL MOTORS PROGRESS........... 48
MECHANICAL NOTES FOR DRIVERS........ 50

PAGE
MUNICIPAL SERVICE EXTENSIONS........ 52
HARKING BACK HALF A DECADE........ 54
PATENTS 55
NEWS NOTES OF TRADE................ 61

The Autocar

Seventy-Four Autocars Owned by John Wanamaker

Three years ago John Wanamaker bought one of our Commercial Vehicles. A year later he bought several more. When we complete his present repeat order he will have SEVENTY-FOUR Autocars in his Delivery Service.

John Wanamaker finds that each Autocar does the work of many horses. On one route alone, for example, a Wanamaker Autocar averages 65 miles per day over steep hills and rough roads. Formerly it required six horses to cover this route, eight being needed in rush seasons. The one Autocar covers it every day in three hours' less time than the eight horses.

Our product is endorsed by 600 of the country's leading business concerns owning from one to seventy-four Autocars each

Write for list of users and Catalog Series No. 4D.

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The
COMMERCIAL VEHICLE

Vol. VII April, 1912 No. 4

New England's Truck Show

Closes with Numerous Sales

First Separate Commercial Exhibition in the Hub Brings Out Large Number of Cars—A Large Attendance and Great Interest Besides Much Business Done

BOSTON'S first exclusive truck show was held in Mechanics building, that city, from March 13 to 20, inclusive, and was a great success. No less than 260 vehicles were on exhibition, the product of 57 different makers, representing the very cream of the industry. As compared with the New York and Chicago truck weeks, it may be stated in a word that this exceeds either New York show but falls short of Chicago. At the Palace there were 33 makes, at the Garden 37 and at the Coliseum and Armory 82.

In this connection it should be stated that Boston's is a different display from any of the others, so much so that it has been called the dealers' show. This indicates the character, agents and dealers from all over New England waiting to make their final decision as to agency and number of cars when they have seen the Mechanics hall showing. While this referred to the pleasure vehicle mostly, last year it was seen to be similar in the case of the commercial cars shown, and this time it was more than ever apparent that the same thing would apply to the trucks.

If any one thing was more apparent than another, in the whole range of vehicles of various motive powers and all body forms, as well as every different size, it was the display of dumping bodies. Other shows may have had a few, some many, but Boston had more than all others put together. There were no less than 21 counted, in wood and steel, hand and power operating, and in other forms. In this list there were represented 13 different makers, so that it could not be considered as a special bid for business in one line by a single or a couple of makers.

When questioned as to reasons for this, various agents gave as reasons the fact that Boston was improving as a coal truck center, that sand and gravel men there were showing a tendency to buy trucks, and that other industries were looking around. With perhaps half a dozen exceptions, the vehicles shown were for coal firms in or close to Boston, the Metropolitan Coal Company, for instance, having a Couple-Gear and a Mack on display, while a repeat order for five of the former was conspicuously displayed. The Staples Company was represented by a Commer and a Mack.

In the line of steel bodies, no less than 11 were shown by eight makers, while of fire vehicles there were six makers represented by seven cars. Among the latter the small Buick-Machaley chemical seemed worthy of mention. This is a very small, light, fast wagon with a 35-gallon tank, and is intended for but two men, the driver and another.

General View of the Small Hall at Boston, Looking Toward Stage and Showing Peerless, Eckhard, Stearns, Gramm, White and Packard

In the line of ambulances and other municipal cars there were five firms with a car each, while the special body forms, aside from those just mentioned, were numerous. They included everything, lumber trucks, 'buses, sightseeing cars, undertakers' wagons, ice, bank, furniture and others. A notable type of body which seems peculiar to New England was the low paneled side furniture body. This was not seen at other shows.

In the way of power, there were many electrics, as was predicted in the March issue of the COMMERCIAL VEHICLE, and in addition, one steam car, the Stanley. The maker of this showed a light delivery chassis and a five-seated mountain hotel 'bus or brake. This has removable seats so that baggage and freight may be carried behind if desired or if passengers are lacking.

Of the newcomers, the less said the better. The Chalmers showed a light delivery wagon on a regular 30 chassis, Ford the standard Model T with a paneled delivery body. The Couple-Gear is better known than any of the other newcomers in the show area, the two vehicles being of the battery-driven form with dumping bodies. Clark is a conservative maker, doing business on a small scale and not attempting to go out of New England for the present. Mais is well known through the Middle West, but this show marked the first public appearance, with a number of good-looking vehicles. The only others were Eckhard and Teel-Woodworth. The latter is a well designed three-ton carrier, three forms of which were shown. It was claimed that this firm had been in business for several years under another name and had a dozen machines in use around Providence.

A Corner of the Main Floor at Boston, Showing Band Stand Above and General Motors and General Vehicle Displays. The Former Was Largest in Point of Numbers

The Eckhard showed more novel ideas than any vehicle present. It had coil auxiliary springs, a six-cylinder motor, a torsion rod connecting front and rear axles, water pipe of standard brass pipe, two clutches, two differential locks and a number of others.

Up to Saturday night, that is covering the first three days and four nights, over 25 bona fide sales had been made as a result of the show and not as a result of previous campaigns, announced at this time for effect. Since these represented the poorest days of the week in weather and otherwise, it seems fair to suppose that the other three days would produce as much business. That would give a total of 50 trucks sold as a result of the exhibition, with a value of perhaps $125,000. Many dealers closed up during the week, one firm alone getting three new agents for a total of about 20 cars. Another Western maker was certain to dispose of 25 cars to agents and dealers in and around Boston, the majority of these having been closed or agreed upon. Many others did nearly as well. It seems conservative to predict a total business done in this line of more than $325,000, which with the retail sales makes the exhibit results come very close to the half-million mark.

There were a number of meetings during the week, the largest and most important being that of the New England division of the Electric Vehicle Association of America and the Electric Vehicle Club. At this meeting several excellent papers were presented, among them one by P. D. Wagoner on "The Electric Vehicle for Trucking and Delivery." In the course of his remarks on the economic possibilities of this type of truck, Mr. Wagoner stated that in this country there was over $30,000,000 invested in electric pleasure vehicles and more than $10,000,000 in electric trucks. Of these, he said 31 per cent. were sold during the year 1911. He

The Eckhard Truck, One of the New Ones at Boston

spoke on several cases of truck installations, and showed the greater efficiency or superior economy of each, winding up with a few well-chosen words on the subject of standardization.

At the meeting of the Retail Coal Dealers' Association of New England, held on March 14, W. P. Kennedy, transportation expert, spoke on "The Economic Application of the Motor Truck to Coal Transportation." In part, Mr. Kennedy spoke as follows: "There are at present many impediments to such machine employment, due largely to delays incident to making the delivery as well as the delays quite frequently experienced in loading at the coal yard. Unloading conditions present the greatest difficulties because they are usually beyond the control of the operators, but the yard conditions being absolutely in the hands of the coal operators, there should be no reason why the loading of coal cannot be accomplished with very short delay to the machine.

"Another important consideration is that unless the loading and unloading of the coal is performed by mechanical means it is difficult to show a saving, unless the distance over which the coal is transported is sufficient to make the speed of the truck effective as a saving. The dependence upon any hand method of loading and unloading is prohibitive.

"Another impediment is the fact that the transportation of coal is a seasonable performance and the long months of inactivity, as well as the difference in volume of business between the mid-winter conditions and the seasons of lesser activity at the beginning and end of this season, make it somewhat difficult to decide upon an equipment which will be large enough to take care of the maximum conditions and yet will not involve too much investment for the average or normal conditions, and further, the possibility of selecting an equipment of such character as to permit of its use in other lines of service when not required for coal transportation.

"The problem, therefore, is not whether coal can be transported more cheaply by machines than horses, but whether the existing conditions in any particular case will permit of the employment of the machine to anything like its economic capacity. Sometimes these conditions are unchangeable, and again slight modifications or changes only are necessary in bringing about new conditions which permit the machine's utility to be taken advantage of.

"Finally, it should be borne in mind that if there is a long period where the machine is not required for coal transportation and the operator maintains his own garage, it will be quite possible to rent such an equipment at profitable figures in other lines of service, and while assuming control of the garaging and maintenance of the vehicles the owner takes little risk or hazard in leasing the vehicles for such extra service.

"It can be readily assumed that such service can be leased at a profit and if this profit be credited against the winter performance cost of the equipment in delivering coal the inactive months of the coal business may thus be made a benefit rather than a detriment to transportation cost by the employment of a motor truck equipment. The addition to the haulage outfit then, would equalize the dull and busy seasons and make salaries and profits more uniform."

Exhibit of Teel-Woodworth Trucks at the Boston Display with Three-Ton Chassis in the Foreground

The Trend of the Times in Truck Work

Suggestions to Those Interested in the Purchase and Sale of Commercial Vehicles for Improving Their Efficiency and Increasing Their Economy—Influence of Various Factors—Auxiliary Loading Devices

Part III.—Considering the Influence of the Shows

THE business in commercial vehicles has not been so good in several of the large cities where truck shows were held, since the closing of these shows.

Many big truck manufacturing concerns and dealers now confronted with this lull of business, are more or less perplexed. The perplexity is temporary. It is perplexing in that the enthusiasm developed previous to and by the shows was overestimated by many of the commercial vehicle manufacturers and dealers. They anticipated an avalanche of business immediately after the close of the shows. A few of them looked for business during the show, but the majority were content with securing lists of prospective buyers, which lists they had hoped to follow up with amazing results during the month following the close of the show.

The Aftermath of the Shows

The shows are now more than a month gone and still in many cases the business has not come as expected. In fact, with several truck makers, there has been a better business in many of the smaller cities where truck shows were not held than there has been in those cities where special exhibitions were held.

If we analyze the causes of this apparent let-up in vehicle purchasing, we find a number of reasons. It is a fact that the general show situation throughout the country had an amazing stimulating influence in business. Its influence on the mind of the truck manufacturer was that he emerged from the long period of show stress with its exhilarating influence, and he imagined the public would flock into his show room to see the trucks. Due to the shows, he unconsciously developed an attitude of hyper-expectancy to which there has been little fulfillment, and the lack of this is due to the mental attitude of the purchaser. This must be analyzed in order that we can satisfy ourselves that the present condition is a temporary one, but which requires considerable energy on the part of the dealer to shorten or minimize any or all bad results from it.

Digest of Part III

COMMERCIAL vehicle manufacturers anticipated an avalanche of business during the truck shows and immediately after; but since the closing of these, business has not been good.

SHOWS stimulate the business and prove to the purchaser that the trucks have reached a great state of perfection.

MANY business men, however, have been dazed by the number and quality of good vehicles available, which have brought home to them the thought that much care must be exercised in the purchases.

MANY buyers offer the excuse that the end of fiscal year postpones the purchase of trucks. Therefore, if a show is to be depended upon for sales it must not come close to the end of the fiscal year.

IN a close sale or a big deal which is doubtful of accomplishment, frequently the influence of a personal call from the general manager or some executive may be used to advantage.

Previous to the show the buyer was for a long time in an unsettled condition of mind and was unable to make a determination on what make of truck or what particular capacity was best suited for his conditions, and he seized upon the approaching show period as an excuse to postpone buying, since he wanted to have the largest scope for observation and study of the different vehicles which the show would give him.

During the show period, and particularly since, he has been astonished at the commercial vehicle talk made to him on vehicle equipment for delivery work, and it has dawned upon him that the commercial vehicle has reached a vastly greater state of perfection than he imagined. He is astonished at the magnitude of the investment in the industry and the production of the different makers in it.

The Buyer's Mental Attitude

During the show he went from booth to booth of the different makers receiving marked and intelligent attention on the conditions with reference to his requirements, and he was more or less amazed at the adaptability of so many different types of commercial vehicles suited for his particular field. He became so wrapped up in the investigation of the commercial vehicle field and laid himself open to such a variety of arguments in favor of different vehicles which varied slightly that at the end of his show investigation he found himself to be in a condition of abject confusion, and less able to decide on which make of vehicle he would buy than he was before the opening of the show.

As a specific example, one large Chicago buyer, a few days after the closing of the Coliseum truck show, telephoned to the maker of a certain line of trucks asking him to make out orders for two of his machines. The shows had so befuddled him that he was entirely at sea as to which was the better make of vehicle and he decided to buy this particular one because a fellow business friend was using such a make with entire satisfaction.

But look once more at this prospective buyer who left the show. He left the show with the avowed intention of revolving the whole commercial vehicle matter over in his mind. He decided to proceed more slowly than before the show. He possessed the sub-conscious belief that the subject of trucks is a much greater one than he had previously considered it to be and that so far as his personal requirements were concerned, he recognized that deciding upon which make to buy would be a difficult matter.

What is the result of this mental attitude?

He postpones from day to day. He discovers further that his presence at the different maker's stands at the shows has created in the local dealer a strong desire to sell him that particular make of vehicle. He discovers that the salesmen from the different local agencies are particularly active with him. In some cases this activity becomes so conspicuous that it irritates him. He is flooded with communications; he is bothered with calls of urgent and persistent salesmen, and fearing that an audience with many of these salesmen will only confuse him more, he fights off all of them, being personally convinced that the subject must be revolved over more in his own mind. Being further convinced of the importance of a proper installation of vehicles he resolves as a matter of self-defense, and also for temporary peace of mind to fight off and defer all buying for the present.

A plausible excuse offered by many prospective buyers is the end of the fiscal year of the company which, with many concerns, is almost coincident with the show period. It is a fact that many business houses will refuse to consider large investments of from $25,000 to $100,000, which the truck installation would call for because of the approach of the meeting of the board of directors, and the natural desire to keep expenses down previous to that time. After the meeting there is a lull until the new board has matters outlined.

One Successful Sales Method

With a fore-knowledge of conditions some of the older and more shrewd truck manufacturers and dealers anticipated these conditions before the recent show circuit started and made preparations for it. Their plan was briefly as follows: On Nov. 1, two months previous to the opening of the show circuit, they rallied their entire sales force and brought into action every influence to stimulate them to the highest point of efficiency to make as many sales as possible before the show opened, so as to avoid the risk of losing a single prospective buyer due to the conflicting influences of competitors during the show week, and the confusion which the glamour of the show will produce.

What was the result of these pre-show campaigns?

The business that such companies set out to get was secured before the show opened, and the entire sales organization went to the show with a clean sheet, went with a corps of salesmen filled with enthusiasm and a keen appetite, and also went with the assurance that they had nothing to lose and everything to gain during the show week.

There is another series of reasonings for the delay of many companies buying trucks, which, however, is temporary, but which was particularly conspicuous after the New York and Chicago shows. This was the fact that many large corporations and other organizations sent delegates, or in some cases, commissions, to the show. These delegates generally consisted of a competent engineer and a subordinate executive of the firm as well as a transportation expert. The work of these men was to investigate thoroughly the merits of every make of truck exhibited and to present the results of their investigations and make recommendations to the board of directors. Naturally, such a course of action is slow in developing sales, and the information collected was of so extended and varied a character as to require time to digest, and often after the submission of such reports to the boards of directors more time was needed, particularly by conservative business men. This delay was often due to the realization on the part of the board of the immense importance of the commercial vehicle as well as the amazing progress it has made during the last year. The entirely new ideas obtained by the delegates on the economy of large installations of commercial vehicles opened new avenues of thought to the big business houses.

This temporary stampede of business has centered largely in those cities where shows were held, whereas, as previously stated, there has been a healthy trade in outlying cities and larger towns, a fact which bears out the truth of an earlier statement that confusion was bred in the minds of many buyers by the show circuit.

A Possible Solution

After having tried to diagnose the cause of the temporary lull in business, it becomes a much more difficult problem to present the solution. It must be kept in mind that the subject being a pertinent one with all companies, the continuance of it is regarded as an impedence to the general course of the administration of the buying companies. No doubt all are called upon to decide questions of equal importance and a much greater finance, and it is, therefore, natural to expect that no long interval will elapse before the business will come.

The question before each expectant dealer is how best he can get part or all of the business when it comes,

Digest of Part II.—March Issue

BESIDES the maker, there are three big influences back of the electric commercial car, all interested financially in furthering it.

ONE trouble in the past has been the refusal of buyers to accept recommendations from the better informed car manufacturer. This is particularly unfortunate for the small firm to whom a wrong purchase means so much.

OPERATING costs divide naturally into three parts, tires, batteries and mechanical parts. If guaranteed at all, each of these should be backed up by its specialized maker not by the builder alone.

THE car manufacturer should assume a just responsibility for the parts of his own make but should not be required to assume labor charges for making repairs.

THE time will come when guarantees will be eliminated as unnecessary. Until then, instead of helping the user and paying for it, too, the manufacturer should insist on the latter paying for his education.

ANYTHING that can be done by horses in merchandise delivery can be done by electric vehicles. This work divides into four parts, each with its special considerations and preferred type and size of vehicle.

and how he can create an inclination on the part of the buyer to purchase his trucks when the latter finally decides to buy? We have seen that the persistent activity of too many salesmen may be a detriment to some degree, but it must be recognized on the other hand, that if the truck dealer and his sales force are not constantly on the qui vive his competitor may exercise greater salesmanship and secure the order, and it is, therefore, important on the part of every dealer to exercise the sales ability of his force to the highest degree and be in evidence constantly with prospective buyers and without generating irritation.

To cope with such a case calls for the aid to the selling force of the best assistance which the truck maker can afford; and not infrequently it happens that the personal influence of the company making the truck may be exercised with advantage in having the president, general manager, or other high executive personally communicate by letter with the highest executives in the purchasing company. This is particularly so where large installations are to be made. It is becoming common practice for each truck factory to have a corps of three or four specialists who at a telegraph call will go to any city in the country and assist the local dealer in making his arguments. There is scarcely a large commercial vehicle installation made at the present time in which factory cooperation is not utilized to the fullest extent.

Much can be done to precipitate truck sales at the present time by the manager of the local branch or salesroom. He should have frequent conferences with his sales force. Let him take their confused opinions and concentrate on them, one at a time. It happens frequently that during a lull, such as the present one after the shows, the salesman is to a degree helpless, and more is needed with the buyer than the influence which he can exert. He has informed the company of the prime consideration that business can be had but that it is an effort; that the buyer is in a hesitating attitude, and that what is needed is the introduction of some catalitic force, the very presence of which will produce immediate business. Let the head salesman get all of the conditions of each particular case from each salesman so that he can put his fingers on the weak spots in each, taking cognizance of all influences.

It is an essential to know the ammunition used by a competitor in making a sale. The branch manager should ascertain from his sales force the regard the buyer has for his particular truck or delivery wagon, and what features of the vehicle appeal especially to him and what ones he objects to. He should find also the point of superiority in the rival truck on which the buyer is concentrating his attention. He should estimate on the strength of the personnel of the rival dealer and see if he is at an advantage or disadvantage in this respect. He should look into and investigate all of the influences that his competitor can bring to bear on the buyers.

Let the manager see if he can bring into strong evidence parallel cases in which his particular truck is in use and is operating with entire satisfaction. Let him show if he can examples where repeat orders have been given for his truck in lines of industry allied to the one in which he is aiming to make a sale, or in which the operating conditions are similar. Let him consider what arguments he can advance to persuade the buyer that he will receive better service in the matter of truck maintenance than his competitor, if he has a legitimate reason to advance such an argument. Let him call attention to and lay strength on the strong financial standing of the company manufacturing his truck and its ability to cope with all conditions as judged by past performances.

If he so desires let the manager of the branch or sales department bring the influence of satisfied customers to bear on his prospect. Some of these customers may be disposed to write to the prospect, telling him of the performance of their trucks. It is a fact that nearly every big concern is getting confidential reports on the operation of trucks by other companies before finally placing their orders. It is a fact that several large concerns and leading business houses have made serious errors in the past by purchasing vehicles not well suited to their particular needs. Such concerns never make a similar mistake twice. Other companies have watched these errors and have made up their minds that they are not going to fall into similar traps. Because of this state of affairs it frequently is considered good policy to have satisfied users of trucks write to prospective buyers.

The branch or local salesroom manager will often find it valuable to secure a conference with the buyer. The manager can go with his salesman under circumstances that will permit of a thorough confidential and assuring interview, the main object of such a conference being the establishing of a feeling of confidence in the product which it is often impossible for the salesman to create.

Let the truck dealer not make the error of selling to his own disadvantage during a period of lull. It is a true fact that there is none so liberal as the desperate. The manager must bear in mind that often his competitor is new in the truck business and in his desperation to get some trucks in operation his liberality knows no bound. He will meet any requirements that the buyer requests. The legitimate dealer must, under such circumstances, be awake to the fact that some business is a disadvantage to him. In a word, he is better off at the end of the year not to have made certain sales. There are buyers who, due to the work performance of their trucks or the peculiarities of their business, expect more from the dealer than it is possible for him to furnish. In reviewing the facts and tactics which his competitor may employ it will become evident to the legitimate truck dealer that he could not drop to such levels under any circumstances. Such actions for sales are frequent suicides, and the legitimate dealer can often serve his purpose best by allowing his competitor to do business by such means, as they will without doubt wipe him off the map, and the sooner such happens the better.

CHARGING INTERESTS VEHICLE ASSOCIATION

At the monthly meeting of the Electric Vehicle Association of America, held in the Engineering Societies building, March 26, a large attendance listened to the paper on Efficient Charging of Electric Automobile Batteries, by J. F. Lincoln, Lincoln Electric Co., Cleveland.

In his paper Mr. Lincoln presented some interesting data on charging in various cities and the benefits which would be derived from a standardization of batteries. He said in part: "Efficient battery charging is complicated for two reasons, different voltages and varying rates. Usually this is achieved by a single voltage supply reduced through a rheostat. In one garage, cars with these batteries are charged every night; 55 with 28 cells, 22 with 26, six with 40, 18 with 24 and three with 40."

How Chicago's Coal Supply Is Handled

Details of Coal Delivery With Its Four Divisions and Different Conditions Existing in Each—Factors Which Make Motor Truck Use Impracticable or Impossible—Tonnage Handled in Each Division

Part II—Retail Delivery of 4,650,000 Tons

Digest of Part II.

CHICAGO burns 14,000,000 tons of coal every year.

OF this amount 4,650,000 tons are delivered in retail service. In this 3000 horses are employed. There are also five motor trucks.

IF conditions were right, so far as loading, unloading, and traffic are concerned, all this delivery could be made by motor trucks.

BUT conditions are not favorable, unloading facilities are not modern, loading facilities are not up to date, and street traffic has not reached its ultimate solution.

BECAUSE of these unfavorable conditions it costs 30 to 50 cents a ton to deliver coal in Chicago.

BECAUSE of more favorable conditions, coal is being delivered in the city of New York to-day at 15 cents a ton.

AS is usual, the public pays the entire difference.

COAL delivery costs much money at its best, but when that best is very poor, inefficient and unreliable, the cost is relatively very much greater. The additional charges must be added onto the price the coal consumer is required to pay, for the dealer can not take it out of his profit and remain in business. As a result, since everyone must have considerable coal in one form or another, it might be stated that this is one of the factors in the present high cost of living. More efficient delivery, which means motor truck delivery in almost every instance, would reduce this.

This can not be the case until operating conditions and habits are altered to conform to the greater speed, carrying capacity and efficiency of the commercial vehicle as compared with the horse. In no one city of the country are these conditions and habits so large a factor in the situation as in Chicago.

The retail delivery in that city of 4,650,000 tons of coal is divided into four main departments, occasioned by the geographical nature of the city. Chicago is a city of intense business congestion; it is a city of enormous residential area; it is a city with factories scattered in all four corners; and it is a city in which railroads thread every quarter of it. Because of these conditions, the conditions governing retail delivery of coal are unique, and, in a word, may be described as the most difficult of solution of any American city.

The four divisions of the retail coal delivery are as follows:

No. 1, Central Division—1,750,000 tons.

No. 2, Apartment Building Division, 1,000,000 tons.

No. 3, Domestic, House-to-House Division, 900,000 tons.

No. 4, Miscellaneous, Factory, etc., Division, 1,000,000 tons.

These four divisions comprise the grand total of 4,650,000 tons of coal that must be transported from the many coal yards in the city to the ultimate consumer.

It is to the solution of this problem, fraught with numerous difficulties, that the motor truck manufacturer and dealer must apply themselves, if they want to reduce the number, 3000, of horses now in service and increase the number of motor trucks, five, now in use. This problem comprises a labyrinth of intricacies. To begin with, the average haul in the city is but two miles. This means that loading and unloading facilities of the most modern type must be made use of if the motor truck is to be adopted. Throughout the city are miles of non-improved streets which are factors. In No. 1 division there are problems of traffic congestion which are factors. All must be solved.

No. 1 Division, 1,750,000 Tons

It takes 292 three-horse teams to handle the daily deliveries of coal to the central division, work that with proper loading and unloading facilities could be done by fewer than 100 motor trucks.

The central division, commonly called the loop district, is a rectangular territory, 1.5 miles long by .75 mile wide. On three sides of this area clusters residential Chicago, on the fourth is Lake Michigan. Here is the business heart of Chicago, seething with traffic, with poorly paved and poorly kept streets for the most part, a thoroughly unattractive place for the use of a commercial car.

Into this small district each year come these 1,750,000 tons of coal, with little thought spent on facilities for its proper reception. Most of this, to add to the difficulty, is of the soft grade, more difficult to deliver, and more costly to load and unload.

One thousand one hundred and sixty-seven five-ton loads of coal are hauled into this district each working day, the average haul being two miles, and each team hauling four loads as a maximum. At this figure it takes 292 three-horse teams to do the hauling, 876 horses in all.

On an actual test, a five-ton motor truck recently delivered 14 loads of coal in a day's work and on a day when the temperature was 10 below zero. If facilities were right so that every truck could do as well, 84 trucks could handle all the coal deliveries of this congested district. This change alone would save to the congested loop district almost a mile of street space. To obtain this delivery efficiency the trucks would have to work at night, a scheme impracticable at present as the theater and restaurant owners object to deliveries during their hours of business on account of the disturbing noise.

Though one truck made this showing under present conditions there would have to be an improvement before a fleet of trucks could do the same as with one truck for which runs can be picked out where delivery facilities are right. With a fleet each vehicle would have to take its turn, which would cut down efficiency 25 per cent.

Improvements Necessary Before Coming of Fleets

The motor truck as a broad proposition is a machine whose value to its user is limited by the mileage he gets out of it. If left to itself any truck can show a big mileage gain over horses, but running time is only one factor.

There are three divisions of time in the use of a motor vehicle, only one of which enters the credit side of the books: Loading time, dead loss so far as service is concerned; running time, what the truck is meant to do as much of the time as possible if it would be made to pay, and unloading time, also a dead loss so far as truck service is concerned.

With horses the loading and unloading times are not a dead loss, as every animal must have rest periods in its labor, but with a truck, which is primarily a machine for transporting goods, every standing moment is lost service, and lost mileage is lost money.

With long hauls the loading and unloading times are not so important, for the very conditions keep the truck going most of the time, but with short hauls these waste periods are by far the most important item and have the largest bearing.

Unlike New York, Chicago is a network of railways, feeders to every branch of the city, so that in delivering coal a truck rarely need make a run over two miles. It is, then, a city of short hauls, whence it is easy to see that the time required for loading and unloading is of paramount importance.

Only a beginning has been made in Chicago in the line of increasing facilities in the matter of truck use, though new buildings going up are fitted as well as conditions will allow. That the dealers and manufacturers recognize a difficult situation is evidenced by the fact that but five demonstrations of trucks for coal use have been made in Chicago, in so far as can be ascertained, and though 3000 horses are in use in coal hauling in Chicago by a very conservative estimate, there are but five motor trucks attempting the service. Only one of these is working in the central district.

Digest of Part I.—March Issue

WHEN downtown buildings are fitted with proper receiving facilities, the coal dealers of Chicago will adopt motor trucks exclusively.

A TRUCK costing $5,000 must do more than just twice the work of a $1,000 horse outfit to justify the original outlay.

THE majority of office buildings in Chicago lack alley coal dumping facilities, which cost their owners millions each year, because a city ordinance taxes such openings heavily and requires a large bond for their use.

UNTIL some steps are taken toward changing the alley conditions, the best proposition is the sidewalk dump, a makeshift and a great obstruction to pedestrians.

ALL of Chicago's school coal, 80,000 tons a year, must be shoveled by hand at a yearly loss of $8,000 for shoveling alone, because delivery openings are five feet above the ground.

COMMERCIAL vehicle coal delivery at schools is made more costly by the necessity for the use of school scales, widely separated and located at but a few of the buildings, necessitating double trips. Nearly all of these, too, are too small for motor trucks.

THE day is coming when the motor truck will be adopted in the coal business and every other line of city transportation and will stop the biggest waste in modern civilization.

In unloading a number of different types of receiving openings are found in this central district, each determined by conditions peculiar to the situation. Some are doors in the alley wall, some sidewalk holes, and the best ones openings in the floor of the alley so that a truck or coal wagon can be dumped directly and quickly. With an alley door, as at the New York Life building, trucks have unloaded in regular service within seven minutes. Other alley doors are small, some not two feet square, and here more time is taken up. If receiving openings in alleys could be made as large as the end gate of a truck all would be well, but many are so small that the driver can open but a small door in the tail gate and allow the coal to drool out slowly. Soft coal cannot be made to run through a small opening at the dump body angles, hence the dump body is useless unless openings are large.

Variations in Receiving Openings

Soft coal in order to dump properly, even with tail gate open, needs an angle better than 45 degrees, especially if it be wet.

Where the opening in the alley is merely a chute leading sideways to a bin there is little gained, for then an extra man is necessary below to trim the opening so the coal can flow through. If the opening is next to the wall, too, a dump body is hindered. For use in Chicago's narrow alleys, some of which are only 14 feet wide, but litle turning can be accomplished with a truck.

With a side wall door like at the McCormick building or the La Salle hotel a chute is used and the coal scooped to the opening in the side of the wagon. This can be done in a remarkably short time if the men working really wish it. On a recent occasion when a representative of the COMMERCIAL VEHICLE stood by the side of a coal wagon with a four-ton load as it was unloading, the driver and helper, seeing the notebook and pencil, felt that they were being watched and really worked. The two men had the entire load scooped down the chute in three minutes from the time the hopper was opened. Average time would be three or four times this. Indeed one man with such a load rarely unloads under 20 minutes, and in some instances the time has been over an hour.

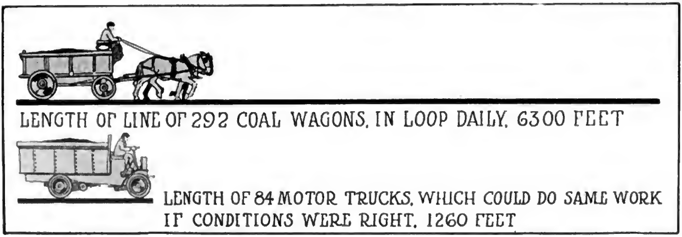
Sixty tons of coal a day are received at the Boston Store through sidewalk openings. There is provision in the basement for 42 coal cars from the Illinois tunnel, which runs under the loop at this point, but no coal has been delivered through the tunnel since Christmas time, at least to this store.

The Blackstone Hotel, one of the newest and most up-to-date hostelries, boasts of four sidewalk holes located near the main entrance. The alley at the side is very narrow, and here the wagons must go first to be weighed. If a truck be used it must weigh elsewhere, for the scales are only 12 feet long and too short for the average truck. When weighed the wagon must wait its turn to unload.

On account of the nearness of the coal holes to the fashionable entrance it is required that all coal deliveries be made between 6 and 7:30 each morning. Forty-five tons a day are unloaded at this hotel.

The Palmer House coal doors are in the wall of a very narrow alley, frequently blocked for an hour at a time. It is no infrequent sight to see drivers assist those ahead of them to unload in order to hurry up their own turn.

The Congress and Auditorium hotels, furnished from the same power plant, use from 100 to 190 tons of coal a day, depending on the season. To receive this amount there is a small grated door two feet square in the floor of the alley next to the wall and a good-sized door further down at the opposite side, giving facilities better than the average. There is in the coal vault, however, room for but 48 hours' supply of coal, so that deliveries are made here every day in the year except Labor Day. Coal is delivered until 12 midnight the night before and starts again at midnight of that day.


LENGTH OF LINE OF 292 COAL WAGONS, IN LOOP DAILY, 6300 FEET
LENGTH OF 84 MOTOR TRUCKS, WHICH COULD DO SAME WORK IF CONDITIONS WERE RIGHT, 1260 FEET

Relative Street Space Occupied by Trucks and Horses

Graphical Showing of the Much-Needed Space in the City Streets Which Would be Saved by Substituting Motor-Driven Vehicles for the Present Horses. This is Needed More in Chicago than in Any Other Large City but Does Not Present the Other Enormous Saving in Time Due to Greater Speed and Less Space Occupied by All Vehicles on the Streets

The Great Northern Hotel uses 30 to 40 tons of coal a day, received through a sidewalk hole about two feet square.

The La Salle Hotel, a fine new structure, and using 60 tons a day, has a door 18 by 24 inches in the floor of the alley next to the wall. The Sherman House near, using a like quantity of coal, has a side door in the wall, but with a steel hopper door, illustrated herewith, that helps somewhat in the ease of unloading over an ordinary swing door. Originally coal was received at this building through a door in the alley, but the owners of the adjoining building objected and the hotel manager had to move its door to the wall.

Marshall, Field & Co. receive 60 tons of coal a day through four sidewalk holes 18 by 20 inches.

As a matter of checking up the developments in new buildings tending toward coal motor vehicle use in the loop several of the representative architects of Chicago were visited by a representative of the COMMERCIAL VEHICLE, among them E. C. Renwick, of Holabird & Roche, designers of many of Chicago's downtown skyscrapers. This firm is very much alive to the coming of the motor truck as a delivery unit, and is taking it into account in many of the new buildings, though hampered in a more complete arrangement partly by owners who do not see the truck as a near possibility.

Motor Truck Must Come Soon

"The motor truck is coming," said Mr. Renwick, "just as surely as the locomotive came, and it will be as great a factor in transportation eventually. Knowing this, why not recognize it in modern design? In the matter of coal reception, however, there always has been trouble in locating just the best place for the storage space.

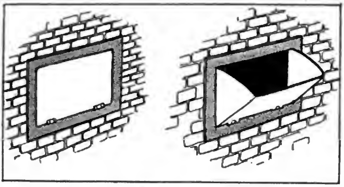
"All Chicago buildings above a certain size must be fitted with automatic stoking devices. This being the case, there must be a sufficient head on the coal to deliver it above the furnaces without shoveling. The storage space, too, must be near the furnaces and the angle for soft coal not under 45 degrees.

"With most buildings sidewalk space is at a premium, so that the coal space must be at the farthest corner back in the least valuable space and with the other units of mechanical equipment grouped about."

With the McCormick Building, for instance, a design of this firm, there was an agreement made back in the '80's between the owners on either side of the present alley. When it came to putting a coal space under this alley the old agreement came up, and it was found that neither party could use the space for any purpose other than as an alley pure and simple. It was attempted to set this agreement aside, but with no effect. The doors for coal reception at the McCormick Building are therefore in the wall, as illustrated in our last issue.

On the question of the La Salle Hotel coal door being close to the wall and so small, it was explained that the hotel owned but half of the 18-foot alley, part of this nine feet being taken up by a huge retaining wall. The space left made it necessary to set the small door in the location noted.

As explained, the coal door of the Sherman House was originally in the alley floor, but was moved to the



Hopper Used on Hotel Building

A Small but Very Necessary Time-Saving Device Utilized on One of the Larger Hotels to Economise on the Time of Coal-Handling Vehicles. This is Set Low Enough to be Used by Motor Trucks.

wall location on protest from neighboring but not neighborly owners.

In new buildings of the Central District the following provisions are being made:

Hart, Schaffner & Marx....	Alley door.
Republic Building.........	Sidewalk hole, 30 inches square.
Rand, McNally...........	Sidewalk hole, 30 inches square.
Powers Building..........	Alley door, alley 14 feet wide.
Rothschild & Co..........	Alley door.
North American Building..	Alley door.

It will be noted that most of these have the door in the alley floor, suitable for a dump body truck.

Deliveries Should Be Made In Alley

W. B. Mundie, of Jenny, Mundie & Jensen, architects, agreeing with what has been brought out already, took the stand that all coal deliveries should be in the alleys and none at the sidewalk. "When a coal wagon stops in the street to unload, shoves out a trough and stands for one-half hour or more blocking both street and sidewalk for that time there is something wrong. I am entirely in favor of the alley door for dumping, and wherever possible it should be specified and put in," was his opinion. He thought, however, that each case had its own problems, which often kept off for other reasons many desirable things, so that sometimes it was impossible to arrange good coal unloading facilities, much as one might like to.

Henry C. Ericsson, Chicago's building commissioner, expressed himself as being very favorable to the alley opening for motor trucks so that dump bodies could be used. "In building work," said he, "we have used very successfully such an opening for unloading building material. This we arranged by a framework of planking underneath with an opening six feet long above the width of a couple of planks. For unloading these two planks were taken up, the wagon driven over the narrow hole and the load dropped down through. If some such scheme could be arranged for coal delivery much time could be saved."

Ideal Method Includes Dump Body

Such a scheme further refined as to construction would be near the ideal for coal delivery if other conditions allowed it. However, there is no motor truck now made which can dump its load directly beneath as these wagons used in construction work do, on account of the obstructing machinery beneath. Some day may see a truck designed exclusively for coal work with shorter wheelbase, hopper bottom and other features, but for the present the receiving systems should fit the trucks.

Undoubtedly the Central District presents the greatest variety of problems of any class of coal delivery work in Chicago. Only time can change the receiving conditions, as owners, by a campaign of education, come to see that a saving can be effected by proper arrangements. Until that time comes when these receiving facilities approach the ideal it is up to the makers to produce a truck which can cope with the greatest number of unloading conditions successfully. Undoubtedly within a few years the coal business of central Chicago will be handled by motor trucks in spite of receiving conditions for reasons which will be pointed out later, and when that time comes these trucks operating will gradually change receiving conditions by the education of their owners through daily operation.

To operate successfully in the Central District the ideal truck must be capable of the following:

It must admit of quick loading by hopper.

It must be able to unload in a minimum of time either soft or hard coal with only the driver to operate it under the following conditions

(a) Into an opening 18 inches in diameter or over, directly underneath, to the side, or to the rear.

(b) Into a window at the side, either below the bottom of the body, level with it, at the side or above. This in a fashion which will not permit the wind to blow soft coal dust about on a gusty day.

(c) Into a sidewalk opening at varying distances from three feet away or more, through coal holes from 18 inches diameter up.

It must be of a short enough wheelbase to fit on standard length short scales.

It must have a short turning radius to be handled easily in narrow alleys and congested streets. Any arrangements which would save time in working into unloading position would be of advantage.

It must be well sprung for poor pavements.

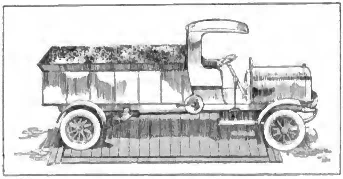
It must be fitted with tires suitable to rough work on bad surfaces.

It must be capable of a speed of from eight to 12 miles an hour, depending on size of truck. Average load at present is five tons.

It must be capable of working into a 14-foot alley on reverse without the necessity of an extra man to direct the driver in his backing.

Quietness of operation will eventually be demanded by cities and even by Chicago.

Such are a few of the various functions which would be demanded of an ideal motor truck for use in Chicago's



Present Coal Scales Are Too Short

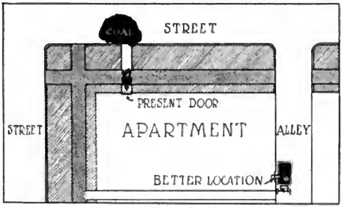
The Public Scales Which Must be Used for Weighing Coal, Sometimes, are too Short for the Longer Motor Trucks, Although Long Enough for Horses. Until this Defect be Remedied, Greater Distance Must be Traveled with a Loss of Economy.

loop district. Some cannot be met as yet, others can; some will be met by a change in facilities at receiving points, others can be met better by truck design. The successful use of motor trucks for coal delivery in Chicago's loop is up to architects, city officials, truck builders and designers, body builders and users.

No. 2, Apartment Delivery, 1,000,000 Tons

It takes 208 teams to deliver coal to apartment houses in Chicago, 3333 tons of coal being delivered a day in average four-ton loads, with an average trip of two miles. A good team can make four trips a day, delivering 16 tons. Eighty-three motor trucks could do this work if conditions were right. Alwart Brothers, delivering to apartments with a locally built truck, make six trips a day, delivering 40 tons, this one vehicle doing the work of two to three teams. With this record as a basis, allowing 40 tons a day for a truck, 83 motor trucks could deliver the 3333 tons a day. Working nights, this figure could be cut almost in half, though night delivery is almost impossible in this service at the present time.

Apartment delivery in Chicago is a separate problem in itself. Instead of being confined within a certain area, these buildings are scattered throughout the whole city, although through the multiplicity of coal yards there is an average haul of only two miles.



Present and Suggested Apartment House Methods

Instead of Handling Apartment House Fuel Supply as at Present by Wheelbarrow Across the Lawn with Consequent Dirt, Noise, Delay and Expense, a Proper Receiving Hole on the Side Alley Would Allow of Motor Truck Use.

This short haul again calls for quick unloading and loading if motor trucks would be used. When they are adopted eventually in Chicago this city probably will have more quick loading and unloading data and devices than any other city in the world, as nearly all of its delivery work in all lines is based on short hauls.

The average apartment house has its consignment of coal delivered through a front window in the basement, the coal being carried over the front lawn. In the first place, the coal, generally soft, is dumped into the street by the delivery wagon. From here planks extend to the coal window and a man with a scoop-shaped wheelbarrow wheels the coal from the street pile to the window where he dumps it. The load carried in, there is a great black spot left in the snow of the road where the coal was dumped, a black streak running to the window and a smudge over the front of the building. If it be a windy day conditions are worse. After a few days snow comes, however, and covers the dirt. Then comes another load and more dirt, to be covered by a further fall of snow. When spring comes and the snow melts an accumulated dust of a number of loads is found deposited on the front lawn, to the great detriment of the new growth of grass.

In many cases this condition is not necessary. Thousands of apartment buildings with alley connection take in their coal in this way when an alley dump could be arranged just as well, saving the consumer as well 10 cents a ton on having it hauled in.

The Motor Trucks Now In Use

The truck used by Alwart Brothers is a seven-ton machine, built locally. This truck has been in use nine months, making on the average a four-mile trip out and back, doing the work of two three-horse teams. The machine is fitted with a dump body. Making six trips a day on an average, according to Alwart Brothers, 40 tons a day are delivered. A large amount of this is apartment house delivery. Ordinarily the coal is dumped in the street, men are left to wheel it in and the truck goes on its way. On boulevards there is naturally an objection to coal being dumped in the street, so in these cases the load is often taken in bags, when the truck must wait during unloading to take the bags back. With a crew of three men this takes but little time, though more than would be the case under more ideal circumstances. The dump body with them has been a distinct success.

A truck is now demonstrating for the City Fuel Company, handling apartment work largely. On March 11, its first day, it hauled five five-ton loads, earning $13.25.

The Western Fuel Company has a five-ton truck in use on apartment delivery largely with good success, though not what it would be if a little more attention were given to its successful operation. A three-ton truck is also operating for this firm, carrying an average load of four tons, an overload condition, which speaks for itself. This smaller truck is used in apartment work as well.

Though there has been exceptionally bad weather, the trucks have operated without trouble. The average length of the trip is three miles, shorter trips being left to horse trucks. Teams make four trips one day and three the next. Trucks make four and six trips. The coal is loaded by hopper in an average time of 10 minutes. One-half to two-thirds of the loads must be unloaded by hand on account of poor receiving facilities. No especial study has been given to eliminating waste moments in unloading so far as could be ascertained.

A trip was made on the three-ton truck to check up conditions. The delivery was two miles out from the yard, four miles in all. On arrival three minutes was spent in backing to a window at the rear of the apartment, and 31 minutes consumed in unloading, one man shoveling. After the load was off eight minutes was taken in cleaning up spilled coal around the window. The following is a summary of the trip:

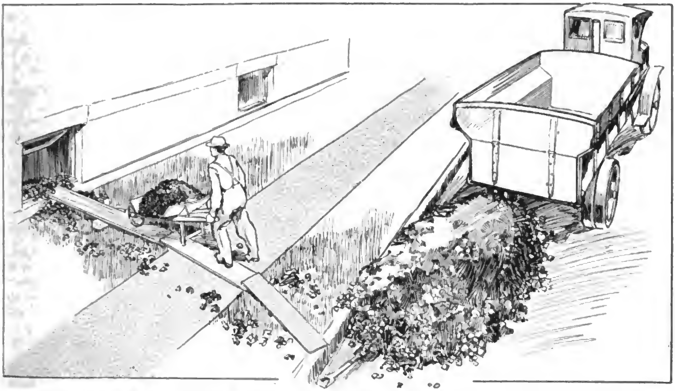
Leave yards, Adams & Rockwell	12.07	Time
Arrive	12.22	"
In position to unload	12.30	"
Empty	1.01	"
Window cleaned	1.09	"
Away for return	1.11	"
Arrive	1.26	"
Total time gone	1 hour 19 minutes	

Distance, four miles round trip. Load four tons.

Horse team could do same trip in 30 minutes more time. Investment, $1,000.

For such service as this on the average a truck hardly can be made to pay. A 50-cent repair would have put the dump body in working order, it only lacking a bolt, which would have saved considerable time. The coal could then have been dumped at the window, a man left to shovel it in and the truck could have made an extra trip.

From all appearances the vehicle itself was not getting the attention it should have had. There were no visible sign of its having been washed since its purchase, rust was everywhere, chains were loose and sprockets worn, while from the continual overload the rear tires were in bad state. A three-ton truck cannot be expected to stand up under a four-ton load as a general proposition, yet if this machine does not make good the truck will get the black eye. A little thought given to the truck's use would enable it to make good.



Graphical Illustration of Present Wasteful Apartment House Delivery

This Sketch Brings Out the Present Operating Conditions Under Which it is Impossible for Motor-Driven Vehicles with Power-Dumping Devices to Make a Showing or Even Compete on Equality with Horse Delivery. Any Possible Saving in Transit or Dumping is Nullified by the Hand Work Necessary to Put the Coal in the Cellar

If a car rightly handled can deliver 40 tons of coal a day in apartment service in Chicago, there is a field for trucks in Chicago right now in this work. At some future time trucks for this service will be fitted with some sort of a conveyor which will deliver the coal into front windows across lawns without soot or deposit of coal dust and in a few minutes.

No. 3, Domestic (House-to-House) Delivery, 900,000 Tons

Coal delivery to dwellings, known as the domestic delivery, is an involved proposition and at present an almost impossible field for motor trucks in Chicago. In this service, comprising the delivery of 900,000 tons a year, the average load is under two tons and the haul three miles. This does not state the problem entirely and correctly, however, as from one-half to two-thirds of this domestic coal business is bag delivery. Two thousand five hundred small expressmen buy coal in bags from the City Fuel Company alone and others in proportion. One-horse wagons sell much of this from house to house, while a large percentage of householders who do buy coal in larger amounts buy merely a ton at a time. This means a team and a two-ton wagon making two stops and two deliveries on each run with a corresponding increase of mileage. Receiving facilities for a large percentage of deliveries require the carrying in of the coal, another bad feature.

Domestic delivery of coal will probably be the last field invaded by truck users.

No. 4, Miscellaneous Power Division, 1,000,000 Tons

Fifty-six motor trucks could handle the 1,000,000 tons of coal going to miscellaneous power plants of Chicago, now requiring 190 three-horse teams.

The average run for this service is two miles, the load five tons. This makes 200,000 loads a year, 667 loads a day. In this work is required therefore, allowing three and one-half trips a day for a team, 190 three-horse teams.

With proper receiving facilities, allowing 12 trips a day for a five-ton truck, a figure which already has been set by a truck in this work in an 18-hour day, 56 trucks could handle all of this work. On a nine-hour schedule 112 would be necessary.

Here is a field where trucks eventually can be used to a large extent. Receiving facilities ordinarily are good and some ideal, while, being fairly large users, these people can change their receiving facilities to fit when they see the monetary need. The City Fuel Company has had a six-ton truck operating in this field with good success, though runs are picked for it where there are good receiving facilities.

It is hardly fair to take any one day's work as a direct comparison of the team-versus-truck situation because there are so many outside factors, far removed from mere cost of delivery, which are in favor of the motor vehicle. Chicago coal dealers own only half the horses which they operate in their service in winter. In summer some of those they own are not working, while the winter use of extra hired teams is at an undoubted profit to the teaming concerns and an extra cost to the coal men.

When slippery weather comes, and such storms as Chicago is subjected to, all horse delivery is seriously crippled, much more so than motor service, and it is at just these periods that coal delivery on schedule is most important. With a fleet of trucks sufficient to meet the summer needs on a nine-hour schedule there would be time for overhauls and repairs and when the winter rush came working time could be lengthened, extra crews put on and the trucks worked 18 or even 22 hours a day when conditions demanded. In working thus trucks would pay.

Coal men of Chicago are considering seriously the motor truck. Mechanical advance will be an incentive to their buying, but what is wanted much more than merely a more perfect vehicle is a system of loading and unloading that will fit all Chicago conditions of delivery.

Chicago may be looked at as a future truck center, and the lessons learned there as the basis of future truck salesmanship and design. What will fit in Chicago will make good almost anywhere.

Automobiles and Trucks Commended

IN his report on the maneuvers of the Massachusetts National Guard along the Southern side of the Merrimac river, Adj.-Gen. Pearson spoke very highly of the automobiles utilized, although he questions their advantage on narrow roads. He speaks very well also of motor cycles for army use while a portion of his report includes the comment of Capt. N. E. Menna and the First Lieut. E. C. Marshall, Jr., of the regular army. A later report says one brigade was equipped with motor transportation and the other with horse trucks. The former was better supplied. It is understood that the experiment in the use of motor trucks will be specially reported on and therefore is not discussed in detail in this report. The value of motor trucks as army transports had been established beyond question prior to this maneuver. Experiments with them in this maneuver served only to show some of their weak points. It would appear that their proper place is well to the rear in the supply columns, and that wagon transportation should be used for the close supply of troops. Wagons are a necessary link between the motor trucks in the supply column and the troops at the front. The motor truck is not yet a reliable means of transportation on muddy roads or off roads at any time.

It is possible that a more reliable motor truck and one which can be depended upon to take the place of animal-drawn transportation immediately accompanying troops may be developed in the future. There was not a clear understanding among line officers as to the formation, march, and status of the field train. This was probably due to the fact that the officers had had little or no previous experience with the field train for a force as large as a brigade.

Abbott-Detroit Mail Wagon Now In Use In Its Home City

PLANS PROGRESSING FOR TRUCK PARADE

NEW YORK CITY, March 25.—At the monthly meeting of the Motor Truck Club, held in this city March 20, the matter of details in connection with the annual parade to be held Saturday, April 13, formed the principal business and brought out a number of committee reports and some debate. Among other things, a uniform charge for entries was settled, this to include a pair of banners and two signs with the name of the vehicle.

The various committees of the club and its members as a body were appointed special committee members to secure entries. It is hoped to have in line no less than 500 vehicles, thus eclipsing the splendid showing of last year when there were over 350. It is planned, moreover, to have superior permit and police arrangements so that the display may proceed as a unit from the starting to the finishing point, and thus complete the demonstration.

After the regular business session a paper on "Increasing the Utility of Commercial Cars by Auxiliary Loading and Unloading Devices," previously presented to the Society of Automobile Engineers at its annual meeting, was read by its author, Edward W. Curtis, Jr.

ONE OF DETROIT'S MOTOR MAIL WAGONS

No city of the country has made greater or more rapid progress in the adoption of motor-driven vehicles for mail service than Detroit, often called the Hub of the Automobile World. In the illustration herewith is shown one of the more recent cars placed in this service. This is a standard Abbott-Detroit chassis with the general form of enclosed mail wagon body. Since it was placed in service several months, the work done has been very satisfactory to both government officials and its maker.

Commercial Vehicle Tires in England

A Complete Review of the Foreign Situation with Direct Reference to Those Conditions Which Bring About Such Gradual Tire Wear and Thus Produce Enormous Mileages—Part I

By Arthur E. A. M. Turner

IN dealing fully with this subject a few words as to how European solid commercial vehicle tires are used, at any rate in England, and what they are used on, may preface the proposed discussion. As to the first, they are, the writer would add, doing service in this country on self-propelled vehicles of from 1.75 to 10 tons gross weight, which are in charge of men of very fair intelligence as a class and who by this time are possessed of a great deal of practical experience. Even if not from any higher motive, this enables them to keep their 'buses regularly running up and down the respective routes and their trucks and wagons going to and fro with entire freedom from breakdowns, collisions, bad skids or the like, which, if they happened, would result in less wages, less leisure and would increase the ranks of the unemployed. In addition to the experience gained by the drivers, various schemes which go to make them careful have been put forward by 'bus people and business houses, such as a payment of, say, 12 cents a week toward accident insurance, which is returned with an addition if the man has run his vehicle without a collision, etc., attributable to him during a year. There are also direct bonuses of $25 and more an annum for taking the vehicle through 12 months successfully and when there is evidence at the half-yearly or yearly over-hauls that it has been handled carefully by the man in charge. One of the best examples of the careful treatment by the drivers of commercial road motors in Britain is furnished by the fact that one hardly ever hears of smooth tired 'buses or trucks skidding in London or its suburbs, while five years ago during damp weather serious damage was being done hourly by them. As the writer always maintained, the only non-skid for a heavy motor vehicle is a careful driver and experience has proved this to be the case.

Part I—The English Roads and Drivers

IN addition to the experience gained by the majority of English drivers, various schemes of a payment nature, which go to make them careful, have been put forth by 'bus people and business houses.

THE result of weekly premium and yearly bonus plans has been small repair bills and tire mileages varying between 30,000 and 50,000 miles in some cases.

MACADAM surfaces are practically unknown in London itself, the majority of the streets being paved with wood blocks which wear very evenly for about 10 years.

EXPERIENCE has proven over and over again that the fitting of the best tire of the largest possible section compatible with the size of the motor is right.

THE tire guarantee is really only of value if the tire maker wants to retain the business.

HOWEVER good a tire may be, it is practically useless if its fixing is otherwise than positive.

THERE are four ways of buying tires, but the best and most satisfactory one is to go to the best makers, buy the biggest section possible and pay cash for it.

It will be apparent that when four or five years ago inexperienced purchasers were worrying their heads over non-skids which would carry six or seven tons, when they knew nothing about the vehicles themselves and organization of bodies of drivers, that a driver, possibly with his hands still smelling of the leather reins, could with some sort of safety—as regards his job—afford to lose his head when his vehicle assumed too varied a course on a greasy stretch of road through his clapping on the foot brake suddenly. Now, when his advent in a shop window, or the continual breaking of lamp posts, street collisions, etc., would result in the loss of his weekly payment toward insurance, his annual bonus from his employer, possibly one from the tire makers as well, even the otherwise flush drivers make it their business to be steady and level headed in dirty weather. The results are small repair bills, appreciation by the public and tire mileages varying between 30,000 and 50,000 miles in some cases.

By the above, of course, the writer does not wish to suggest that the British commercial motor drivers are now more careful of other vehicles simply because they can get a bit extra by being so. Many—and no doubt the majority—take a conscientious interest and pride in keeping their vehicles going without untoward or unpleasant incidents.

Now as to what roads the solid tires are used on. Well, I suppose, with the exception of the main roads in France, the English roads are the best in the world. One thing that favors this is that it is a small country. In London itself the majority of the street surfaces are composed of wood blocks, which wear very evenly for about 10 years, after which the concrete foundations give way in places and the surface becomes uneven. The Councils of Holborn (W. C.) and Westminster (W. and S. W.) use some Trinidad asphalt, which is beautifully smooth but is difficult to negotiate in dirty weather. London, going toward the north, northwest and southeast, has large areas of granite sett-paved streets, with double lines of electric conduit-system car tracks. These in the main

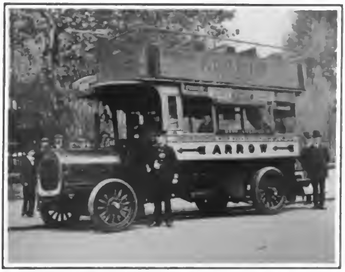


Fig. 1—London Motorbus on Wood Pavement, with Shrewsbury and Challiner Solid Tires. Some of These Vehicles Go as High as 47,000 Miles a Tire

are evenly laid, but much less so than even worn wood blocks. If they (the granite setts) are destructive to solid rubber tires, it does not arise so much from extra wear, but from the fact that in passing over them and bumping from one to another, the tire generates heat which, if the service were continually over such a surface, might shorten the tire's life.

The Roads They Run On

In these sett-paved and car-track districts drivers avoid running along the tracks as much as possible, as a sharp turn off them might result in a bad skid, which, as already explained, would be detrimental to the driver's interest. The really bad stretch of paved wood road in London runs through Clapham, which is very old wood; this is always about to be re-done, but it has been really bad now for many years. Macadam surfaces are practically unknown in London itself, except for a few byways in Westminster. In the suburbs, say from eight to 10 miles distant, you get the main roads with macadam surfaces of rolled tarred granite chippings which are mostly very good, and if properly tarred are almost dustless. The average camber or cross fall for roads surfaced with granite or flint is given as .58 inch a foot, and .25 to .375 inch for wood blocks or granite setts. The width of gutters is 18 inches, while the depth of curbing is usually 3.75 inches. The writer has dealt at some length with the above two points as the importance of good driving with regards to tire mileage cannot be overestimated, while if you have not got reasonably decent street pavements in conjunction with good driving you may give up any idea of getting extraordinary long life from your solid rubbers.

Types of Tires Recommended—How They Are Bought

In dealing with solid commercial vehicle tires I will only deal in detail with band rubbers, which rightly are displacing the pressed-in pattern in Europe. As will be seen from the illustrations A, B and C of Fig. 4, the purchaser of pressed-in tires actually pays for about two-thirds of the rubber which cannot be used, as the tire is worn out when it gets down to the dotted lines A1-B1, A2-B2 and A3-B3. Again, the pressed-in form has not the resiliency of the band rubber—let any doubter strike both patterns when fixed to wheels, alternately, and he will find this out. Further, so little of the rubber is above the rim that objects in the road such as stones, etc., or edges of street car rails may strike the metal rim, to the detriment of the axles, etc., especially if, as is often the case, they are employed on light live axle wagons in this country. This lack of rubber above the rim is unavoidable in the pressed-in type because as much above as below would make the top sway too great when rounding a corner and the tires would become detached. They should be ruled out entirely therefore, but more as to results from their use later on.

Tire Sizes and Satisfactory Results

The scope of an article on the above subject would be far from large if the advice which experience has proved over and over again to be right had been adopted by all users, namely, the fitting of the best tire of the largest possible section compatible with the size of the motor. It happens only too frequently that users take many years trying all sorts of devices before they gain the necessary experience, and it therefore behooves all those interested in the industry to bring before the user's notice as often as possible the saving effected by a large section of tire in order to disabuse their minds from a penny-wise-pound-foolish policy.

The chassis-manufacturer's selling or business man has been, until quite lately, a difficult man to handle; he is getting better, but there still is much room for improvement. His object is to sell his firm's chassis—that is the sum total of his existence; such et ceteras as tires matter little to him.* If the customer has bought small and

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*Note—Abroad, chassis are sold without tires, almost universally.

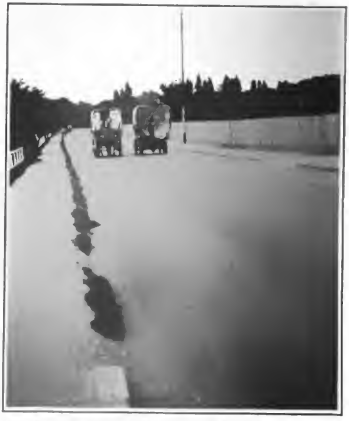


Fig. 2—Tarred Surface on a Hill in the Suburbs of London on a Main Road, Showing Motor Wagon Passing a Horse Vehicle

cheap tires he will be able, the salesman reflects, to change them when they are worn out and to have others fitted. A few words of guidance might have saved his customer a lot of money and have resulted in not only helping his firm to future orders for chassis, but preventing the statements one hears, such as "Costs of tires are prohibitive," which injure the firm's business indirectly. The cost of tires should be quite reasonable—anything from one cent a mile on a one-ton van to five cents a mile on a five-ton gasoline truck.

Unfortunately for the user who has bought a small and perhaps cheap section of tire, there may be attached to them a so-called guarantee of, say, 10,000 miles; that is the mileage which the tire maker assumes the tires will do. This guarantee is really only of value if the tire maker wants to retain the business, and I will try and explain how it operates. The user must keep a record of mileage run, and, assuming after 3000 miles there is one failure out of the set, he writes to the tire maker pointing out the failure and asks for a new tire to replace the one worn out. If the user's figures are accepted (mileage recorders are not infallible and returns may be queried), then the user gets a new tire, for which he is charged in full, while a credit of 7000 miles is allowed. Of course there has been a delay; the wheel has to be taken off the vehicle, sent up to the tire manufacturer and returned. In about another three weeks another tire possibly fails and the process is repeated over and over again.

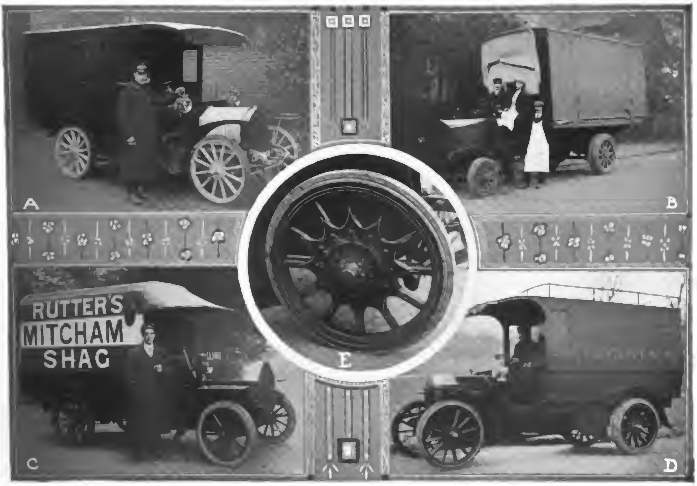


Fig. 3—Some English Cars, Showing Tires and Drivers. At A, Typical Driver of 1000-Pound Chain Driven Wagon; B, Heavy Hallford Vehicle with Crew—Note Even Wear of Tires; C, Live Axle Belsize Car with Solid Tires in Back Only; D, Type of Pressed-in Sectional Tire Which Dates Back to 1904-9, and E, Pressed-in Solid Tire Fitted to Front Wheel of 1500-Pound Van

The user then begins to find that he is losing a lot of working time with his vehicle for which he gets no value; he is busy checking invoices and worrying around, and finally after, say, six months of incessant annoyance, he decides he will have a decent make and large section of tire. He then finds that he has to bear the loss of the mileage between that accomplished by each tire and the elusive 10,000-mile guarantee, which thus proves of no value. This may mean two-thirds of the invoiced cost. Then he has to bear the expense of wheel alterations, fitting new steels and tires, at a considerable capital cost, whereas all this trouble might have been avoided if good advice had been tendered to him in the first instance.

I do not wish to attack any one type of tire, but it is very necessary to point out that, however good a tire may be, it is practically useless if its fixing is other than positive, and that is the case with all clinched or grip-section tires. In the case of light vans I know of instances where such tires have worn splendidly, and, with a low first cost, the mileage costs naturally have been extraordinarily low; but, unfortunately, there is no certainty about them, and a sharp application of the brakes may set a tire creeping, and in a very short while that tire wants renewing. I know of a case where a set of grip-section tires lasted on a two-ton van over 12,000 miles, and the firm got a splendid testimonial. Yet the next set could not stand up for 14 days. This irregularity and lack of uniform service goes to prove that any tire other than of the band section is "fluky" even for light vehicles, and quite out of the question for heavy loads and high speeds.

Speed and Power Influence Sizes

It is no use anybody's imagining that they have the maximum duty consideration when they say the three-ton motorvan goes only 12 miles an hour; they may average 16, but on occasions they do over 20, and it is at high speeds that tires are chiefly tried. For high-powered vehicles a larger tire is essential, though the imposed vehicle-load be not increased. A four-cylinder vehicle carrying the same load as a two-cylinder vehicle requires stronger tires. It is true that the vibration and individual impulse from a two-cylinder engine are greater than from a four-cylinder one, but the extra molecular stress in the tire, which is generated by the quicker acceleration of the latter, both starting and in traffic necessitates a larger section. I purpose, at the end of this article, to give a table suggesting a certain-sized tire for a given gross weight, but before doing so it is important to point out that a larger-section tire is not necessarily a greater consumer of petrol, due to its broader tread; otherwise, some engineers may consider that the saving in tire cost a mile will be exceeded by the added petrol consumption. Experience has shown that, to all intents and purposes, there is practically no difference in petrol consumption if a slightly larger section of tire is used, and experiments made with a section 15 per cent. larger, under the same weights and over similar country, during a period of some months, have proved this.

Four Tire-Buying Methods

Some four ways of buying tires are offered by tire-makers to-day, but of these many modes there is only one really satisfactory one, namely, go to the best band-section makers, buy the biggest section tire possible, and buy it for cash without a guarantee as to mileage. The maker always will guarantee workmanship for his own reputation's sake; that is to say, supposing after a few 100 miles of running a tire failed utterly, proving faulty vulcanizing, the tire maker would replace with a new tire at once. Failures of such a nature are, however, rare.

The next best mode is to buy tires with a 10,000-mile guarantee. This sort of purchase naturally costs more than a clean sale, and the users pay for the risk: it is, in a way, an insurance, and the users pay a heavy premium for the assurance. The premium charged would not be so heavy were it not for the difficulty to which the tire maker is put in proving any short mileage. It is so easy for a user to say a tire has run only 7,500 miles, thoroughly believing what he states to be true, but it is very likely that the tire has run well over its guaranteed minimum of 10,000 miles! A run from London to Ascot and back is, say, 64 miles; but when delivering goods at places en route and at the terminal village, the distance run may be nearer 85 miles, and this excess, multiplied by 100 days, makes all the difference.

The third manner of buying tires is to pay a given sum for each mile run. This is practical where vehicles use a surveyed rout, as do buses, or where a firm owns a large fleet of vehicles, and it is worth the tire maker's while to accept the business. Fourthly, some firms enter into a yearly contract, the tire maker running all risks as to mileage run. It need not be pointed out that the user really pays more in the end on this and all alternative schemes, than if he buys clean and without any conditions which handicap the vendor.

Mileages with Increased Sections

Let us take the 10,000-mile guaranteed tires: the premium added generally equals, or is greater than the cost of buying the next-sized larger-section tires, which would give him a greatly increased mileage over 10,000. Again, here I can quote from practical experience: A 4.5-ton wagon, carrying full load daily, with 4.75-inch tires all around, ran 20,500 miles with two sets of such tires, *i.e.*, each set averaged over 10,000 miles. The price for a set was about $485. A set of 5.5-inch tires was fitted, costing approximately $600, and the life, over the whole set, was 17,200 miles; hence, the cost with 4.75-inch tires equalled approximately 4.66 cents a mile, while the cost with 5.5-inch tires equalled approximately 3.36 cents a mile.

The mileage-basis purchase, unless the contract be a very large one, is hardly worth the manufacturer's while, so he quotes a very high—and even then, perhaps, not profitable—figure. The booking-up of the returns, the collection of payment, and the capital outlay makes this necessary. Finally, with the yearly contract, or go-as-you-please payment, it is a toss up whether the manufacturer makes or loses, and it is only if he wants orders badly, or for some special reason, that he is induced to quote a figure which will lead to business, and then, should it be found unprofitable, it proves to be only a temporary arrangement, since no tire maker or any firm remains in business long if he effect losses.

In the end what pays the user best is the business arrangement whereby a tire maker can afford to sell his tires at a small but clean profit, and the sale outright—

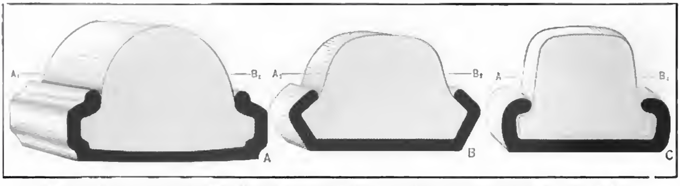


Fig. 4—Sections Through Three Typical English Pressed-In Rubber Tires, Showing Large Amount of Waste Rubber

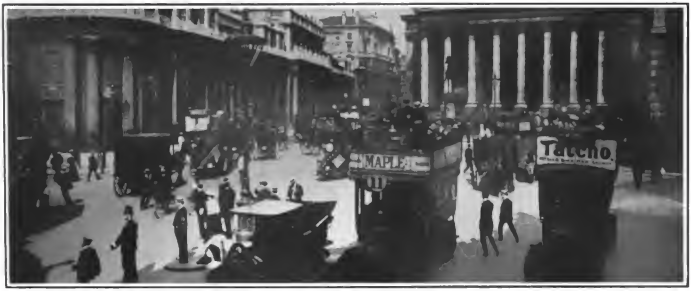


Fig. 5—View in the Heart of London, Showing Bank and Royal Exchange. The Pavements Are Mainly Wood Blocks, Carefully Cared for and Kept Up

no mileage guarantee—will prove the best to all parties in the long run. On that point there is no doubt.

The accompanying table will be of use to all parties who buy and sell tires, and if rigidly observed will advance the interests of all concerned. The list of sizes, *i.e.*, widths of tires, refer to a form in which the rubber is vulcanized to a steel band, and in which the life of a tire is dependent on absolute wear of the tire surface presented to the road, and does not take into consideration a make of tire which becomes often detached at its base, as is the case with a grip or clinched section. I would advise the buying of tires without a mileage-guarantee arrangement, but with a specific guarantee against faulty vulcanizing; the latter is easily proved by the tire's coming away from the base after a few hundred miles of running, in which case a new tire should be supplied free of charge. In the band-section type of tire, this is, as previously stated, only an occasional occurrence, and manufacturers thereof would not charge any premium for such a guarantee, while it would safeguard the user on the one point where failure would be excessively expensive and unfair to him.

The width mentioned is the measurement at the base of the rubber tire. The height of tires should be approximately .75 of the base or width measurement; hence, a four-inch width should have a three-inch height of rubber—a much greater height induces lateral strains, and may damage the base when in work, while a lesser height of rubber means so many miles less life.

To obtain the best results, the gross weight of loaded vehicle set down must never be exceeded. Wheel diameters are not given, as each maker has his own ideas on the subject, but nothing less than a 30-inch diameter on the front wheels in small vehicles should be employed, and 34-inch in larger sizes; the back wheels should be from 32-inch up to 42-inch for large and heavy loads. In cases where the load is well forward, and where the engine is situated under the driving seat, an extra half-inch on the front tires can be safely added. It is of the utmost importance again to point out that any larger-sized tire pays for the extra capital outlay in an increased life.

TABLE FOR SPECIFICATION OF BAND TIRES.

Maximum Gross Weight of Loaded Vehicle.	Width of Front Tires. All Singles.	Width of Back Tires All Duals.
2 tons	3 inch (75 mm.)	2½ inch (65 mm.)
2½ "	3 " (75 ")	3 " (75 ")
3½ "	3½ " (90 ")	3½ " (90 ")
4½ "	4 " (100 ")	4 " (100 ")
5½ "	4 " (100 ")	4¾ " (120 ")
6½ "	4¾ " (120 ")	4¾ " (120 ")
7½ "	4¾ " (120 ")	5½ " (140 ")
9 "	5½ " (140 ")	5½ " (140 ")
10 "	5½ " (140 ")	6¼ " (160 ")
12 "	6¼ " (160 ")	6¼ " (160 ")

DISCUSSION OF TAXICAB EXTRAS IN LONDON

London, March 4—One of the results of the recommendations of the department committee is illustrated by the steps which some of the London companies are taking to recover the extras from the drivers. The recommendations of the committee included the suggestion that the drivers should have the extras which arise through carrying extra passengers or luggage, and amount to 12 cents for each person beyond the first two, while the same amount is charged for each piece of luggage. Although the drivers appropriated the extras before the official inquiry, they seem to have done so with perfect confidence since the recommendation. This has not yet become a regulation, so that the Cab Owners' Association is attempting to recover the extras for the members. This body maintains that the extras are sufficient to pay eight per cent. on the $15,000,000 which is invested in taxicabs in London.

London, March 18—By the decision of the court of arbitration in the taxicab dispute, the drivers have been awarded the disputed extras, also several other points which they demanded.

The exact terms of the award are as follows:

1. The extras belong to the drivers.
2. The driver's proportion of takings to be 25 per cent.
3. No rank or station charges are to be allowed by the employers.
4. Employers are to supply drivers with gasoline at a fixed price of 8d. (16 cents) a gallon for the current year and either allow mileage at the rate of a gallon for 18 miles or to give half a gallon a day free.

Insuring the Commercial Vehicle

The Various Kinds of Insurance in Force, Cost of Each, Different State Regulations Relative to It, Attitude of Agents, Dealers and Owners—Why It Costs Too Much and How It Can Be Lowered

Part I.—The New York Situation

Digest of Part I

SO high are insurance rates that many good business men have taken a chance and do not carry any.

AUTOMOBILE rates high enough at best, have been applied without change to trucks and other commercial vehicles, which do not present parallel or equal risks.

IT is possible by carrying all four kinds of insurance on a three-ton truck, in a reasonably safe business, to pay out in premiums and interest the equivalent of the truck's first cost in less than 10 years.

ONE taxicab owner of twenty-six vehicles in New York City does not carry any fire insurance, preferring to replace a cab a year to paying more than this in premiums.

PROPERTY damage rates are based on horsepower and bear no relation to the possible speed nor permissible total weight.

MANY firms do not carry collision or property damage, preferring to employ very careful drivers and set aside a small annual surplus toward these contingencies..

INSURANCE of motor trucks presents one of the largest problems of maintenance, after the vehicle has been purchased, that the buyer has to deal with. Moreover, it is such a vital and highly important subject that he must give it his personal attention and not delegate it, with power, to a subordinate. Purely from the commercial vehicle owner's standpoint, it may be stated as a basic fact that the present rates are too high, so high, in fact, that they are prohibitive in many cases.

So high are they that in many instances, otherwise good business people and firms of considerable conservative training have taken the chance of not having any protection and have gone without insurance entirely. Primarily insurance is protection, the company doing this kind of business guaranteeing the owner of protection from a certain line of probable injury up to an agreed upon maximum for a specified yearly premium.

The latter is arrived at by the insurance companies by the experience of previous years, that is to say, the accidents or happenings of a year with the sum total of the losses during that period and the amounts received for protection furnish what might be called a mortality table. From this, if the rate has been high, it may be redetermined and lowered, or if it be low, the premiums increased before any new business is contracted for. This method is admirable, and in the course of time will result in bringing commercial vehicle insurance down to the point where it will be as cheap and reliable as is possible. Until a period of time, with its determining experience, and of a sufficient length to produce a reasonably certain law of averages, has elapsed, the rate will have to be guessed at.

This is the condition today; several years ago, there began to be a call for automobile insurance of various forms. The companies were at a loss what to charge and naturally those bolder ones writing the business anyhow, put their rates high enough to make certain a profit regardless of what might happen.

This condition still obtains, for automobile insurance is still in its infancy and any mortality table or figures on the subject which may exist are far from complete and accurate. Consequently, the insurance companies doing this class of business still place their premiums high enough to produce a profit regardless of what may or does happen.

This might be bearable in the case of pleasure vehicles, as from their very nature and the conditions of their use, the risk was great, while from the user's viewpoint protection was necessary regardless of what it cost. In the matter of pleasure, people seldom reckon the cost. It might be cited as a parallel case that many of the highest priced cars are sold to gratify the merest whim in the way of temporarily applied upholstery, paint or trimming. So, too, with insurance regardless of cost, the owner of these vehicles which gratified their whims took every means of protecting and assuring a continuance of these, in the way of insurance. This was done, too, without regard for the cost as in the original purchase.

From this grew up a condition which is very unstable. It might be well enough when applied to the cars for which it was originally intended, but the trouble when the same is applied to business vehicles is decidedly different. The present situation is this: Considering the automobile rate as correct and in universal use, the motor truck is in the eyes of the insurance companies only a different form of an automobile. Hence the rates for the latter have been applied without change or discrimination to the former.

This, from the point of view of the motor truck industry and the users of commercial vehicles, which latter group will include ultimately all business men, is radically and fundamentally wrong. The inability of the insurance concerns to see this point has brought about the present very bad conditions, so that this will be enlarged upon.

The automobile is primarily a high-speed vehicle, capable of rates of travel up to and in some cases exceeding 60 miles an hour. It is of light weight, comparatively, and this coupled with the improved engine of recent years makes it possible to produce high speed in a very short interval of time. One concern, for instance, now advertises that its cars will do 60 miles an hour within 30 seconds of a standing start.

This mobility and rapid rate of travel produce a condition of inherent danger to the car, its occupants and to others upon the streets and highways which it travels. That being the case, its insurance is all the more necessary, and from the insuring company's point of view more risky, and consequently gained only upon the payment of large premiums.

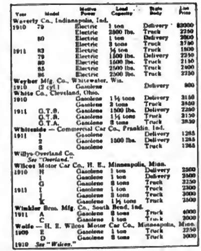
The motor truck, on the other hand, is a decidedly different proposition; primarily it is much heavier, it travels at much slower rates, it is engaged in making deliveries at comparatively short intervals, necessitating many stops and starts, consequently there are no continuous bursts of speed. Moreover, these deliveries eliminate all high speed of any kind and make the vehicle a slow-moving piece of mechanism. Being heavier, with slower rates of travel, it is impossible to get it moving even at its own maximum speed in short spaces of time. It has inertia of position which takes both power and time, but mostly time to overcome. When traveling along the street or road, even at its highest rate, its very bulk and weight make for steady action along straight lines, that is, there is little possibility for erratic or sudden movements in directions at variance with its general direction of travel. Each and every one of these items, and more might be mentioned, has a bearing upon the danger which the vehicle carries with it to itself, its occupants, the public and property in general.

Granting then, a reduction of danger in every possible way and that, too, in a marked degree, there is neither rhyme nor reason in applying the same insurance rates to it. To enlarge upon this subject further, take the item of speed alone. Consider, for the sake of argument, that the average speed of pleasure cars is 40 miles an hour, and for commercial cars 15 miles an hour. The former is very low when road work is considered, while the latter is exceedingly high if any thought be given to city traffic conditions. But there are many conservative drivers of pleasure cars, so the former is fair, while the large number of light delivery wagons do travel at times very rapidly, due to reckless drivers and urgency of certain special deliveries, so that the latter is not unfair.

It seems a very reasonable assumption to say that the danger of occupants and public from the speed of a car varies about as the cube of its rate of average or maximum travel. Based on this the relative danger from pleasure cars and commercial vehicles is about as 64,000 to 3375, or as 19 to one, considering the average speed mentioned above, and as 275,000 to 8000, or 34.4 to one, considering the maximum speed. And yet with a relative risk to all concerned varying approximately between 19 and 35 to one, the owner of the latter type of car is asked to pay equal amounts for equal protection.

To cite a single instance of this, before outlining the general method of doing business, take a three-ton truck of any standard make in a comparatively safe line of work, such as carrying candies from a downtown factory or distributing center to branch stores around New York City. The total yearly payment in this case will be $285, on a basis of about $3600 valuation and original cost. Moreover, in later years, after the time of purchase, the insured value of the vehicle is automatically reduced or else the premium is raised to compensate for this. To insure this same truck in its second year for the original value would total $320, and the third season more than $350.

Based on the original figure, which can be maintained steady by reducing the value of the vehicle each year, according to a schedule fixed by the insurance companies, the owner would pay out for insurance only, the equivalent of the original truck cost in 10 years. That is to say, in that period the annual fixed insurance premium of $285 plus six per cent. on it would total more than the truck cost new.

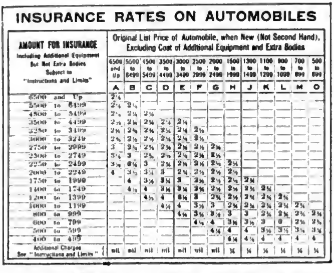


Year	Model	Motive Power	Load Capacity	Style Body	List Price
Waverly Co., Indianapolis, Ind.					
1910	70	Electric	1 ton	Delivery	$2000
		Electric	2000 lbs.	Truck	2250
	80	Electric	1 ton	Delivery	2000
		Electric	3 tons	Truck	2750
1911	83	Electric	½ ton	Truck	1800
	79	Electric	1000 lbs.	Delivery	2250
	80	Electric	1600 lbs.	Truck	2100
	85	Electric	2500 lbs.	Truck	2400
	86	Electric	2500 lbs.	Truck	2250
Weyher Mfg. Co., Whitewater, Wis.					
1910	(2 cyl.)	Gasolene		Delivery	800
White Co., Cleveland, Ohio.					
1910		Gasolene	1½ tons	Delivery	3150
		Gasolene	3 tons	Truck	3600
1911	G.T.B.	Gasolene	1500 lbs.	Delivery	2200
	G.T.B.	Gasolene	1½ tons	Truck	3150
	G.T.A.	Gasolene	3 tons	Truck	3850
Whiteside — Commercial Car Co., Franklin, Ind.					
1911	1	Gasolene		Delivery	1285
	2	Gasolene	1500 lbs.	Delivery	1285
	3	Gasolene		Truck	1385
Willys-Overland Co. *See "Overland."*					
Wilcox Motor Car Co., H. E., Minneapolis, Minn.					
1910	H	Gasolene	1 ton	Delivery	2500
	I	Gasolene	1 ton	Delivery	2500
	G	Gasolene	3 tons	Truck	3250
1911	I	Gasolene	1 ton	Truck	2300
	J	Gasolene	3 tons	Truck	3000
	K	Gasolene	1½ tons	Truck	2500
Winkler Bros. Mfg. Co., South Bend, Ind.					
1911	A	Gasolene	3 tons	Truck	4000
	C	Gasolene	1 ton	Truck	2000
Wolfe — H. E. Wilcox Motor Car Co., Minneapolis, Minn.					
1909	E	Gasolene	1 ton	Truck	2250
	D	Gasolene	3 tons	Truck	3000
1910	*See "Wilcox."*				

Sample Page from the Book of Cars Published by Insurance Companies

A point of view of a careful man here is, why not pass up the insurance and save that money, then at the end of nine or 10 years I will have saved enough to buy another truck? While it may sound heretical to some to carry absolutely no insurance whatever, taking a chance, so to speak, on fire, theft, collisions, property damage, etc., yet it is a thing which is practiced by many firms, as will be shown. A taxicab owner in New York City, for instance, carries no fire insurance whatever. This firm has 26 cabs and past experience has demonstrated that the possibilities of fire are about one in 26 during the year. The price of a new cab is less than the yearly premium on 26 would be, hence the owner, following his own mortality table carries no fire insurance whatever and makes a little something each year at that.

Before considering the situation in New York State, it becomes necessary to take into account the country



INSURANCE RATES ON AUTOMOBILES

AMOUNT FOR INSURANCE Including Additional Equipment But Not Extra Bodies Subject to "Instructions and Limits"	Original List Price of Automobile, when New (Not Second Hand), Excluding Cost of Additional Equipment and Extra Bodies												
	6500 and Up	5500 to 6499	4500 to 5499	3500 to 4499	3000 to 3499	2500 to 2999	2000 to 2499	1500 to 1999	1300 to 1499	1100 to 1299	900 to 1099	700 to 899	500 to 699
	A	B	C	D	E	F	G	H	J	K	L	M	O
6500 and Up	2¼												
5500 to 6499	2¼	2¼											
4500 to 5499	2½	2¼	2¼										
3500 to 4499	2½	2½	2¼	2¼	2¼								
3250 to 3499	2¾	2½	2½	2¼	2¼	2¼							
3000 to 3249	2¾	2½	2½	2½	2¼	2¼							
2750 to 2999	3	2¾	2½	2½	2½	2¼	2¼						
2500 to 2749	3¼	3	2¾	2½	2½	2½	2¼						
2250 to 2499	3½	3¼	3	2¾	2½	2½	2½	2¼					
2000 to 2249	4	3½	3¼	3	2¾	2½	2½	2½					
1750 to 1999		4	3½	3¼	3	2¾	2½	2½	2¼				
1400 to 1749		4½	4	3½	3¼	3	2¾	2½	2½	2¼			
1200 to 1399			4½	4	3½	3	2¾	2½	2½	2½	2¼		
1000 to 1199				4½	4	3½	3	2¾	2½	2½	2½	2¼	
800 to 999					4½	3½	3¼	3	3	2¾	2½	2½	2¼
600 to 799						4½	4	3½	3½	3	3	2¾	2½
500 to 599							4½	4	4	3½	3½	3¼	3¼
400 to 499								4½	4½	4	4	4	4
Additional Charges See "Instructions and Limits"	nil	nil	nil	nil	nil	nil	nil	¼	¼	¼	¼	¼	¼

Fire Insurance Rate Card as Utilized by All Members of the Conference, Which Fixes the Rates. There Are Few Outsiders as a whole. There exists a body called the Automobile Underwriter's Conference, which is the successor to the Association of Automobile Underwriters, and as such determines territory and fixes rates. All underwriters of automobile insurance (and this includes, of course, all commercial vehicles since the two are treated alike) within the United States and Canada are eligible to membership. At present there are 36 members.

The objects of the organization are declared to be as follows:

1. To serve as a medium of exchange of information.
2. To secure the adoption of suitable and uniform policy forms and clauses.
3. To make investigations and recommendations with the object of eliminating or reducing danger of fire and other casualties.
4. To gather statistics and make investigations concerning hazards as a guide to underwriting by its members.
5. To furnish advisory rates of premiums to its members covering general or special classes of business or individual risks, whenever such rates are not prohibited by law.
6. To prevent the making of rebates.

The executive committee has general charge of the business and affairs of the organization and has the power to investigate risks and furnish advisory rates thereon to members. The committee also has the power to make, repeal, alter and amend the rules for the guidance of the organization and its members, and it has authority to levy assessments upon members to cover the expenses of the organization.

No officer or member receives any compensation for services and the assessments and disbursements to date have been nominal.

For convenience the conference divided the country into the following territorial divisions: New England Department, Middle Department, New York Metropolitan District, Western Department, Southeastern Department, Pacific Coast Department.

The units of the divisions are the States of the Union, with the exception of the New York Metropolitan District, which is composed of Long Island, New York, Westchester, Richmond and Rockland counties, New York, and Bergen, Passaic, Essex, Union and Hudson counties, New Jersey.

The rules regulate the maximum number of general agents, local agents and sub-agents which each company can have in any one city, town or state. Rebating by the members or their agents is prohibited, the penalty imposed upon an agent found guilty of rebating being the termination of his agency.

The rules also provide for the maximum commissions to be paid to agents and brokers, the following schedule being now in force:

New England Department, Middle Department and Western Department—Maximum to agents, 20 per cent.; maximum to brokers, 15 per cent.

Southeastern Department—Maximum to agents, 15 per cent.; maximum to brokers, 10 per cent. Exception: Atlanta, Savannah, New Orleans—Maximum to agents, 20 per cent.; maximum to brokers, 15 per cent.

New York Metropolitan District—Maximum to agents, 25 per cent.; maximum to brokers, 20 per cent.

The executive committee has adopted a schedule of list prices of automobiles as a basis for insurance rates, such schedule to be considered as a standard by the members of the conference. Members are also required to use the conference policy forms as well as such necessary riders, clauses or forms of indorsements which may be adopted later or prescribed by the organization.

The conference has made no rules or rates to govern underwriting in the territorial divisions described as the Pacific Coast Department, or in Canada, those divisions being covered by other associations.

The conference exacts pledges from the companies and their agents in the Metropolitan District only whereby they agree to observe all the rules and regulations of the conference in letter and spirit, and that they will not pay any broker any commission in excess of the scheduled rate.

A universal minimum fire rate of 2.5 per cent. was adopted by the association on Dec. 10, 1909. A reduction of 20 per cent. of this rate was allowed on private cars which were guaranteed to be housed in a private garage.

On Aug. 16, 1910, a schedule of rates on the following minimum basis was recommended for adoption:

List Price of Vehicle.	Fire Rate. Per Cent.	Rate with Private Garage Clause. Per Cent.
$3 500 or over	2¼	2
Under $3,500 and not under $1,500	2½	2¼
Under $1,500	2¾	2½

These rates apply to private cars, commercial cars and dealers' cars. This schedule developed into a graduated tariff which was adopted in Sept., 1910, and with some slight modifications is still in force.

A graduated schedule is supposed to take into consideration both the physical and moral hazards, upon the following theories: The cheaper the car the poorer the construction, and therefore the greater the physical hazard; also, the cheaper the car the less care it is apt to receive from its owner, an unintentional moral hazard being thus created; the values of the cars are supposed to be an index of the financial standing of the owner, and an increased moral hazard is always suspected with a weak financial condition of the insured.

The rates are as listed on the rate card shown on the previous page, this applying, however, to the division of fire only. This division insures against loss by fire and theft. The basis of these rates varies with the valuation of the cars, that for cars costing from $1500 to $3500 being 2.5 per cent.; for cars from $3500 up, 2.25 per cent., and cars below $1500, 2.75 per cent. On these basic rates the premium is determined. When the full value is insured the basic rate obtains (the value having been determined by the insurance companies as previously brought out), if the insured value be less the rate does not change, while if a higher valuation be called for the rate is increased to correspond.

Age has a large bearing, a new car being considered a good risk and an old one poor, according to its age; in fact, beyond a certain age it cannot be insured at all. For collision purposes private cars are divided into classes according to the business in which the owner is engaged. These vary with the comparative safety of the vehicles, according to the number of hours worked, the nature of the business and other things.

This list is not made public, but a few instances known may be cited to show the differences existing. In the case of the candy manufacturer cited (truck valued at $3600) the collision risk was (new) $86.40 a year. This same truck in the service of a brewer would pay $125, and an express company, $175. Under the latter head, as an instance, the owner of a truck can take out collision insurance as a truckman or mover at about $80.

but as an expressman it will cost twice that or more.

Liability insurance is usually carried as employer's liability. This protects the assured (generally carried as the driver) against bodily injuries, including death resulting from ownership, use or maintenance of the vehicle, and makes it obligatory upon the insurance company to defend him in court against suits to recover damages. This form often is omitted or not carried on account of the high character and skill of the drivers.

Property damage rates are based on the horsepower, strange as that may seem, and bear no relation to the weight, speed or cost. It would appear as if the permissible speed and the total weight carried would have a greater influence on the damages inflicted, but the insurance companies do not see it that way. The schedule is based on a rate of $1000, and an additional premium of 40 per cent. is charged for each additional $1000.

Over and beyond the four special classes enumerated and described above, namely, fire, including theft, collision, liability and property damage, special policies to cover special forms of insurance desired and at special rates are under the executive committee of the conference, which has power to fix the rates. This applies to such special cases as the ownership of more than 20 vehicles, blanket rates on a concern's entire output, electric vehicle fire rates, dealers, agents and manufacturers as compared with private owners, and others.

None of this insurance covers demurrage or loss through the inability to use the vehicle, no matter how it be disabled, but does include the privilege of transferring the same complete or in part to another truck which may have been substituted for a disabled one. Dealers and agents pay less and usually carry fire only or fire and liability only.

Another factor in the situation is this: Certain states do not permit each insurance company to write all kinds of insurance. This necessitates doing business with two or more, which obviously costs more than it would to do business with a single separate concern. It costs more for two reasons, there are two separate transactions with different parties which would increase the expense somewhat, while the carrying of the insurance in two sets of books by the firms and the inspection of the car or cars by two different sets of inspectors allows of making an extra charge on the ground that the insurance actually costs more.

The law of the State of New York permits a general casualty company to furnish all of the protection which may be required incident to the use of automobiles, that is, against damage to property or injury to the person. A casualty company, however, cannot furnish fire protection. On the other hand, the law of this State permits a fire or marine company to furnish all of the protection required incident to the use of automobiles, except injury to the person (liability). To secure full protection incident of the use of automobiles, it becomes necessary to have a policy issued by a general casualty company and a policy issued by a fire or marine company.

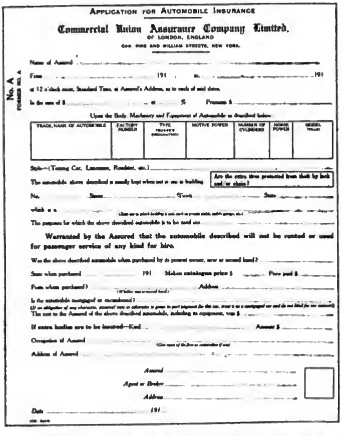
A number of New York firms were interviewed on this interesting subject and the views brought out show a wide diversity of opinion on the subject, although almost without exception users were united on the opinion that rates were too high for the protection afforded and the nature of the risks.

The Hexter Motor Truck Company maintaining the agency for the Gramm line of trucks and a splendid large service station on W. 42nd street, carries only fire, employers' liability and collision. Property damage is not carried on the assumption that careful drivers make it unnecessary, in fact, it is considered possible that collision might be dropped to advantage. It is thought that there is little damage in the way of fire and that the rates are excessive.

H. Moran, moving and express man, with a three-ton Dayton truck which he has had since December last, carries no insurance on it. He admits this is taking a big chance, but says the cost of insurance is so great that it would take all the profit out of his business to carry any.

Acker, Merrill & Condit, owning seven large trucks, three of which are electrics, and operating at the same time 400 horses to supply the 35 branch grocery stores, carry only fire and liability, and carry no property damage on account of the high grade of drivers employed. This was carried formerly, but over a period of many years it amounted to so little that the company gave it up. To some extent it is replaced by a fund set aside each year for this purpose, but it is stated that the latter is much less than annual payments were formerly. It is considered that the relative rates are entirely too high. This firm pays $17 each on a team of horses and $75 for a three-ton truck. It placed itself on record as considering the two out of proportion. This company's vehicles are governed down to a maximum speed of 15 miles an hour.

(To be continued)



APPLICATION FOR AUTOMOBILE INSURANCE

Commercial Union Assurance Company Limited.
OF LONDON, ENGLAND

No. A

Name of Assured

From 191 , to 191

at 12 o'clock noon, Standard Time, at Assured's Address, as to each of said dates.

In the sum of $ at % Premium $

Upon the Body, Machinery and Equipment of Automobile as described below

TRADE NAME OF AUTOMOBILE	FACTORY NUMBER	TYPE	MOTIVE POWER	NUMBER OF CYLINDERS	HORSE POWER	MODEL

Style—(Touring Car, Limousine, Roadster, etc.)

The automobile above described is usually kept when not in use in building

Are the extra tires protected from theft by lock and or chain?

No. Street Town State

which is a

The purposes for which the above described automobile is to be used are

Warranted by the Assured that the automobile described will not be rented or used for passenger service of any kind for hire.

Was the above described automobile when purchased by its present owner, new or second hand?

State when purchased 191 Makers catalogue price $ Price paid $

From whom purchased? Address

Is the automobile mortgaged or encumbered?

The cost to the Assured of the above described automobile, including its equipment, was $

If extra bodies are to be insured—Kind Amount $

Occupation of Assured

Address of Assured

Assured

Agent or Broker

Address

Date 191

Copy of Blank for Application for Insurance on Automobiles and Motor Trucks, the Same Form Being Used for Both

30,000 Now

The Total Number of Commercial Vehicles Now in Use Is 30,000 as Ascertained from Manufacturers, Agents in Various Cities and State Registrations—Magnitude of Industry—Phenomenal Growth—Future Possibilities—Total Valuation

PHENOMENAL is the only word which describes with accuracy and clarity the recent growth of the commercial car industry and its present status among the American industrial giants. It was but a few short months ago that critics and even friends of the power vehicles for business purposes spoke of it as a "coming" industry, always spoke of it in the future tense and generally considered it as something far remote or at least remote.

Numerous figures published on the subject of number of cars in use did much to strengthen this view, for they showed that an exceedingly small number of cars were in actual use, the very smallness of these figures giving color of accuracy to those future references. Spurred on by the good of the industry, the COMMERCIAL VEHICLE has prepared and presents herewith an estimate of the whole number of cars of a business nature now in use, which is believed to be not alone accurate but extremely interesting and instructive.

The whole number has been arrived at from three sources: the manufacturers lists of cars turned out from the start of their business to date (that is, to March 1); the number of vehicles in use in the various large cities of the country, from reliable observers and well informed men in those cities, and from the actual state registrations. The first, after deducting a suitable proportion for those cars which are out of use now, leaves the actual number doing daily work at present. Similarly, it has been estimated upon a number of occasions by competent authority that the number of cars in the smaller cities was equal to those in the larger and better known ones, while the country contained approximately an equal number more. For the sake of being conservative, the latter percentage was reduced to 35, producing a result which approximates the other.

Cities Progress in Six Months of 1911 and 1912

City	Total September 1st, 1911	Total March 1st, 1912	Increase Numbers	Increase Per Cent.
New York, N. Y.	2,500	4,060	1,560	62.4
Chicago, Ill.	1,200	1,800	600	50.0
Philadelphia, Pa.	700	1,000	300	42.9
Boston, Mass.	700	900	200	28.6
Los Angeles, Cal.	70*	760	690	986.0*
Detroit, Mich	400	400	......	......
St. Louis, Mo	less than 70**	400	more than 330	500.0**
Portland, Ore	300	400	100	33.3
San Francisco, Cal.	200	310	110	55.0
Pittsburgh, Pa.	300	300	......	......
Buffalo, N. Y	150	300	150	100.0
Cleveland, O.	150	300	150	100.0
Indianapolis, Ind.	150	275	125	83.4
Minneapolis, Minn.	100	250	150	150.0
Kansas City, Mo.	160	225	65	40.6
Washingtoo, D. C.	120	200	80	66.7
Cincinnati, O.	100	200	100	100.0
Denver, Col.	100	200	100	100.0
Jersey City, N. J.	less than 70	200	over 130	about 200.0
Rochester, N. Y.	less than 70	200	over 130	about 200.0
Baltimore, Md	less than 70	150	over 80	about 120.0
Milwaukee, Wis	less than 70	150	over 80	about 120.0
Newark, N. J.	less than 70	150	over 80	about 120.0
Providence, R. I	less than 70	150	over 80	about 120.0
St. Paul, Minn	100	150	50	50.0
Totals for Above 25 Cities, Excluding the 7 Approximate Cases aod 1 Apparent Mistake	6,430	11,270	4,840	75.1
Average Increase			284	62.5
Average, Excluding Those Not Increasing			324	70.8

*Appareotly First Figure Was a Mistake
**Original Figure Apparently in Error.

By means of registration figures from those states which segregate commercial vehicles from those used for pleasure, and with a close scrutiny of the general registration, coupled with a conservative estimate in those few cases where neither of the others was available, it was possible to secure a list of the totals now paying fees in the various states. This, too, it will be noted, tallies closely with the other two sets of figures.

Commercial Cars in Use in the States

State	Total	State	Total
Alabama	48	Nebraska	220
Arizona	21	Nevada	26
Arkansas	51	New Hampshire	48
California	2,198	New Jersey	1,080
Colorado	239	New Mexico	29
Connecticut	519	New York	7,892
Delaware	78	North Carolina	96
District of Columbia	218	North Dakota	46
Florida	83	Ohio	1,171
Georgia	155	Oklahoma	42
Idaho	22	Oregoo	526
Illinois	2,551	Pennsylvania	2,664
Iodiana	970	Rhode Island	410
Iowa	730	South Carolina	54
Kansas	120	South Dakota	96
Kentucky	146	Tennessee	78
Louisiana	44	Texas	382
Maine	78	Utah	181
Maryland	371	Vermont	34
Massachusetts	2,045	Virginia	100
Michigan	1,146	Washington	169
Minnesota	970	West Virginia	32
Mississippi	36	Wisconsin	580
Missouri	832	Wyoming	28
Montana	34		
			29,719
In Round Numbers			30,000

The whole makes three sets of figures from three separate and distinct sources which arrive at a common conclusion. Upon this basis it seems an absolute certainty that the round sum of 30,000 arrived at by all three is as near to the actual number of vehicles now in use as it is possible to get.

Considering several estimates previously made of the numbers in the various larger cities, which means granting their accuracy, it is possible to gain a faint idea of the tremendous progress which has been made in the more recent past. One published list gave the figures for many of the larger municipalities on Sept. 1. The present list to March 1 gives an interval of just six months. Yet in that brief space of time the increase of the largest 25 cities is almost unbelievable to one not well informed as to the progress of the industry.

As will be seen in an accompanying table, the total number added to those in use in our 25 big cities during the last half year is approximately 5000. This forms an average of nearly 290 for each, while the percentage of growth is 62.5 and excluding those two which appear

Commercial Cars in Use in Cities

City	Whole Number of Cars	City	Whole Number of Cars
New York, N. Y	4,060	Oakland, Cal	80
Chicago, Ill	1,800	Trenton, N. J	75
Philadelphia, Pa	1,000	Camden, N. J	75
Boston, Mass	900	Toledo, O	75
Los Angeles, Cal	760	Albany, N Y	70
Detroit, Mich	400	Des Moines, Ia	70
St. Louis, Mo	400	Omaha, Neb	70
Portland, Ore	400	Birmingham, Ala	65
San Francisco, Cal	310	Troy, N. Y	60
Pittsburgh, Pa	300	Dallas, Tex	60
Buffalo, N. Y	300	Cambridge, Mass	50
Cleveland, O	300	Dayton, O	50
Indianapolis, Ind	275	Erie, Pa	50
Minneapolis, Minn	250	Harrisburg, Pa	50
Kansas City, Mo	225	Houston, Tex	50
Washington, D. C	200	San Antonio, Tex	50
Cincinnati, O	200	Utica, N. Y	50
Denver, Col	200	Wilmington, Del	50
Jersey City, N. J	200	Atlanta, Ga	50
Rochester, N. Y	200	Grand Rapids, Mich	50
Baltimore, Md	150	Jacksonville, Fla	45
Milwaukee, Wis	150	Brookline, Mass	40
Newark, N. J	150	Richmond, Va	40
Providence, R. I	150	Lynn, Mass	40
St. Paul, Minn	150	Terre Haute, Ind	40
Louisville, Ky	125	Wilkes-Barre, Pa	40
Salt Lake City, Utah	125	Duluth, Minn	35
Columbus, O	100	Youngstown, O	35
Hartford, Conn	100	Wichita, Kan	30
New Haven, Conn	100	Scranton, Pa	30
Springfield, Mass	100	Nashville, Tenn	25
Syracuse, N. Y	100	Ogden, Utah	25
Worcester, Mass	100	New Orleans, La	20
Seattle, Wash	90	Portland, Me	20

Totals for Largest Cities	16,065
Add 50 Per Cent. for Cities With Less Than 20 Each	8,032
Add 35 Per Cent for Balance of the Country, Including All Farmers' Vehicles	5,669
Grand Total for Entire Country	29,766
In Round Numbers	30,000

to show an error and two cases in which there was no gain the percentage is over 70. This for a year would mean 140 per cent. Applied to the previous total, this would mean that Sept. 1, 1912, will see no less than 50,000 commercial vehicles in use. On the other hand, the general movement seems to be speeding up, that is gaining as it goes along, so that an estimate made now on the basis of past advances would not be high enough to account for the more rapid adoption of motor wagons the coming summer.

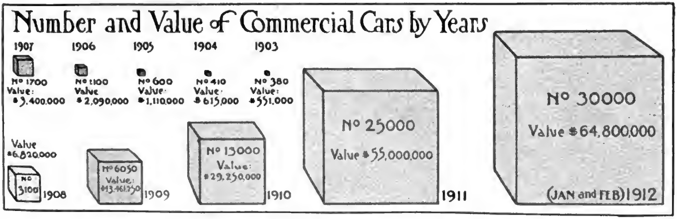
The future always interests, so that several prophetical tables have been prepared, based upon different rates of increase. At the rate during 1911, as compared with the year 1910, it would appear that the country may boast more than half a million, or 657,000 at the end of 1916. But if the more rapid increase during the first two months of 1912 over 1911 be taken as an average percentage during the year, at that time (1916) we will have no less than a million and a quarter in use (1,288,300). On the other hand, it seems reasonable to select a more probable rate based upon those available but with an allowance for future declines below the present high speed rate. On such a basis, also presented in tabular form, the whole number for five years from now will be 310,000. This last is based upon actual manufacturer's shop abilities, discounting possible additions during this and the next two years. It also takes into account the elimination from actual service of the very large number of cars each year, these being of the older vintages and consequently not so enduring.

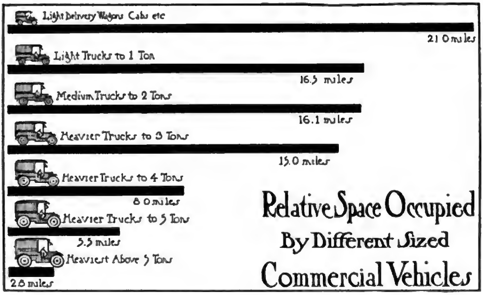
On this last point, however, there is considerable discussion and difference of opinion among the manufacturers. Some claim that truck life when the vehicle is prop-

Manufacturer's Number of Cars Built to March 1, 1912

Number Designating Maker	Cars Built to March 1st	Number Designating Maker	Cars Built to March 1st	Number Designating Maker	Cars Built to March 1st
1	4,500	49	99	97	24
2	3,850	50	98	98	24
3	2,455	51	90	99	23
4	2,300	52	90	100	22
5	2,126	53	85	101	21
6	1,760	54	82	102	20
7	1,522	55	80	103	19
8	1,509	56	77	104	18
9	1,390	57	76	105	18
10	1,220	58	75	106	17
11	1,020	59	70	107	16
12	709	60	68	108	16
13	680	61	65	109	16
14	670	62	65	110	15
15	585	63	63	111	15
16	583	64	60	112	15
17	440	65	60	113	15
18	440	66	59	114	14
19	380	67	58	115	14
20	380	68	57	116	14
21	340	69	56	117	14
22	340	70	55	118	14
23	330	71	55	119	14
24	330	72	50	120	12
25	290	73	45	121	12
26	272	74	45	122	12
27	260	75	41	123	12
28	250	76	40	124	11
29	246	77	40	125	11
30	238	78	38	126	11
31	230	79	37	127	11
32	210	80	36	128	11
33	190	81	36	129	11
34	180	82	35	130	10
35	175	83	34	131	10
36	171	84	33	132	10
37	170	85	32	133	10
38	160	86	32	134	10
39	147	87	32	135	10
40	142	88	31	143—142, 8 at 9 ea.	72
41	140	89	30	146—145, 2 at 8 ea.	16
42	135	90	30	151—150, 5 at 7 ea.	35
43	120	91	30	163—162, 12 at 5 ea.	60
44	120	92	29	170—169, 7 at 4 ea.	28
45	100	93	28	187—186, 16 at 3 ea.	48
46	100	94	27	204—203, 17 at 2 ea.	34
47	100	95	26	250—260, 56 at 1 ea.	56
48	100	96	25		

Firms Now (and Some Which Have Failed)	260
Total of Cars Turned Out to Date by All Firms	37,550
Deduct for Cars Not Now in Use 21 Per Cent	7,930
Leaving Total of Cars Now in Use	29,820
In Round Numbers	30,000





Relative Space Occupied By Different Sized Commercial Vehicles

erly maintained and repaired is limited only by the difference in cost of the yearly overhaul and the value of the car. They say ultimately this will get down so low as the car ages and wear becomes greater that it will not be worth while to renew the old chassis; that is, the cost of repairs would be more than the car is worth.

Number of Cars of Each Size

Class	Per Cent.	Number	Length Placed End to End, Miles
Light Delivery Wagons, Cabs, etc.	34.2	10,250	21.0
Light Trucks to 1 Ton	20.0	6,000	16.5
Medium Trucks to 2 Tons	17.1	5,130	16.1
Heavier Trucks to 3 Tons	14.5	4,350	15.0
Heavier Trucks to 4 Tons	7.2	2,160	8.0
Heavier Trucks to 5 Tons	4.8	1,440	5.5
Heaviest Above 5 Tons	2.2	670	2.8
Totals	100.0	30,000	84.9

The value of the whole number of vehicles brings forth some financial lessons to those who have belittled the commercial vehicle business as an industry. Based upon an average value of $2,160, which seems sufficiently conservative, the cars now in use are worth the tidy little sum of $64,800,000. This average value seems to have increased slowly but surely from about $1,400 in 1902 to the high point of approximately $2,250 in 1910. In the latter year, and last season, a much larger number of small cars was placed on the market, thus reducing the average value. Although many big trucks are being made now, it is doubtful if there is a sufficient number of them to keep the figure up, in fact it appears as if the end of 1912 will see it at or very close to $2,000.

Working Possibilities of the Trucks *

		Day	Month	Year
10,250 Light Wagons at 65 Miles a Day	=	666,250	16,656,250	199,875,000
6,000 1-Ton Trucks at 65 Miles a Day	=	390,000	9,750,000	117,000,000
5,130 2-Ton Trucks at 60 Miles a Day	=	307,800	7,695,000	92,340,000
4,350 3-Ton Trucks at 55 Miles a Day	=	239,250	5,981,250	71,775,000
2,160 4-Ton Trucks at 50 Miles a Day	=	108,000	2,700,000	32,400,000
1,440 5-Ton Trucks at 42 Miles a Day	=	60,480	1,512,000	18,144,000
670 Trucks at 35 Miles a Day	=	23,450	586,250	7,035,000
Total (Possible) Mileage		1,795,230	44,880,750	538,569,000
Light Wagons Hauling 18 Tons a Day	=	184,500	4,612,000	55,350,000
1-Ton Trucks Hauling 20 Tons a Day	=	120,000	3,000,000	36,000,000
2-Ton Trucks Hauling 33 Tons a Day	=	169,290	4,232,250	51,787,000
3-Ton Trucks Hauling 45 Tons a Day	=	195,750	4,893,750	58,605,000
4-Ton Trucks Hauling 52 Tons a Day	=	112,320	2,808,000	33,696,000
5-Ton Trucks Hauling 60 Tons a Day	=	86,400	2,160,000	25,920,000
Heavier Trucks Each Hauling 70 Tons a Day	=	46,900	1,172,500	14,070,000
Total (Possible) Tonnage		915,160	22,879,000	275,427,000
Light Wagons at 16.25 Useful Ton-Miles a Day**	=	166,262	4,156,550	49,878,600
1-Ton Trucks at 32.50 Useful Ton-Miles a Day	=	195,000	4,875,000	58,500,000
2-Ton Trucks at 60.00 Useful Ton-Miles a Day	=	307,800	7,695,000	92,340,000
3-Ton Trucks at 82.50 Useful Ton-Miles a Day	=	358,875	8,971,875	107,662,500
4-Ton Trucks at 100.00 Useful Ton-Miles a Day	=	216,000	5,400,000	64,800,000
5-Ton Trucks at 105.00 Useful Ton-Miles a Day	=	151,200	3,780,000	45,360,000
Heavier Trucks at 113.75 Useful Ton-Miles a Day	=	76,213	1,905,325	22,863,900
		1,471,350	36,678,750	441,405,000

*Based on 25 Days a Month, 300 Days a Year.
**Based on Carrying Rated Load One-Half of the Daily Mileage.

In whole number of actual manufacturers there are 222, divided into 208 making gasoline cars only, 12 building electrics and two making steamers. The electric is coming so fast now that it would not be surprising to see a score of makers in this line in 1913. Similarly, gasoline manufacturers are increasing rapidly, although many are finding the business too difficult and intricate for a fair profit. Now that the glamor of the business may be said to have worn off, it has developed into a more businesslike manufacturing proposition and the future development will lie in the way of a strengthening of the stronger firms at the expense of the weaker ones. As in every industry, it will be a matter of the survival of the fittest.

Some surprising facts are brought out by the manufacturer's table of number built, for this shows clearly that some 11 makers have produced 23,662 cars out of the total of 30,000. This is an average of 2151 each. If 11 makers have brought out 79 per cent. of all the cars, the balance of the 260 firms in business now or in the past, that is, 249 firms, have divided the other 21 per cent. This would give each one less than one-tenth of one per cent. Taking an even smaller number of the leaders, it can be shown that six firms have built more than half of

Investment in Motor Trucks

Year	Number	Price Each	Total Value	Probable Registration Fees Paid
1903	380	$1,450	$ 551,000	$ 1,330
1904	410	1,500	615,000	1,500
1905	600	1,850	1,110,000	2,280
1906	1,100	1,900	2,090,000	4,400
1907	1,700	2,000	3,400,000	7,150
1908	3,100	2,200	6,820,000	14,105
1909	6,050	2,225	13,461,250	28,738
1910	13,000	2,250	29,250,000	64,700
1911	25,000	2,200	55,000,000	125,000
1912*	30,000	2,160	64,800,000	153,000

*March 1st.

Some Lessons in Valuations

Article and Year	Valuation	Remarks	
Gold, 1910	$ 96,055,214	Year's Production	
Silver, 1910	30,476,896	Year's Production	
Total Revenue of Canada, 1909	85,093,404	Pop. 7,081,869	Area 3,729,665
Total Revenue of Egypt, 1908	76,724,134	Pop. 13,250,000	Area 1,393,000
Total Revenue of Sweden, 1908	55,414,147	Pop. 5,476,441	Area 172,876
Total Revenue of Mexico, 1908-9	49,190,204	Pop. 13,607,259	Area 767,005
Total Revenue of China, 1908	21,221,722	Pop. 439,214,000	Area 4,277,170
Total Revenue of Norway, 1909	38,749,682	Pop. 2,302,698	Area 124,129
Total of China and Norway	59,971,404		
Total Earnings, Baltimore & Ohio R. R. Year Ending June, 1911	89,968,130	Trackage 4,469.6	Employees 62,000
Total Earnings Chicago & N. W. R. R. Year Ending June, 1911	74,918,185	Trackage 7,743.3	Employees 51,261
Total Earnings C. R. I. & P. R. R. Year Ending June, 1911	68,487,473	Trackage 7,395.7	Employees 50,000
Total Earnings Ill. Central R. R. Year Ending June, 1911	60,977,031	Trackage 4,550.5	Employees 34,800

Value of Commercial Cars, 1911-12	$64,800,000	Chauffeurs 32,000	
Total of Commercial Vehicle Manufacturers in Country	222	Amount Paid Insurance Companies Yearly for Protection	$5,300,000
Capitalization Based on Average of $200,000	$44,400,000	Operating Cost of All Trucks at Average Daily Cost of $12.60 is, Annually	113,400,000
Yearly Wages of Chauffeurs Based on Average Salary	28,300,000	Operating Cost of 60,000 Two-Horse Teams at Daily Cost of $7.50 is	135,000,000
Probable Number of Mechanics and Garage Men Employed on Commercial Vehicles Exclusively	5,000	Making the Annual Truck Saving, if Only Two-Horse Teams be Replaced by Each	21,000,000
Yearly Wages of these Men at Average Salary	$4,100,000	Annual Tire Bill Approximately	12,335,000

Future Possibilities if Increase Continues

Year	Number	Increase	Per Cent.			
1910	13,000					
1911	25,000	12,000	92.3			
1912*	30,000	5,000	120.0			
	At 1911 Rate		At 1912 Rate		More Probable Rate	
1912	48,100	23,100	55,000	30,000	50,000	25,000
1913	92,500	44,400	121,000	66,000	90,000	40,000
1914	177,900	85,400	266,200	145,200	145,000	55,000
1915	342,100	164,200	585,600	319,400	220,000	75,000
1916	657,900	315,800	1,288,300	702,700	310,000	90,000

*March 1st Only.

the total, or 16,500. This would average 2750 each.

The relative space upon our city streets is important for it shows what would happen if all vehicles were of the heavy slow speed type. The larger the capacity the greater the length of the entire vehicle and body, and moreover the greater its relative obstruction of the streets on account of both great size and slow speed. On the other hand, the small light cars are short and travel at a high rate of speed. This is partly offset by the greater number necessary to carry the total load, so that the relative unit of street congestion when finally determined on an accurate basis may be very similar for the biggest and smallest trucks.

It is regrettable that a greater number of makers did not or could not classify their vehicles by industries. In this connection attention is called to the last table, presenting these figures. For this the larger number of the classifications was reported upon by a few makers, hence the deductions as to percentage of total and the same as applied to the industry are not as valuable as would be the case had all classified their cars accurately and exhaustively.

An inspection of this last-named table brings out some interesting points in connection with the number of cars sold in each of the different businesses. For instance, it shows (for the makers reporting) 658 vehicles in the express and transfer business. These were sold by 24 truck firms, hence the average ownership of each of these vehicles in that line of work is 27.4. In this same line, 75 per cent. of the total number of firms sending classified lists reported so that the express concerns may be considered as having scattered their purchases over the whole industry. Of the whole total reported, 8.72 per cent. were found in this work. Applied to the entire industry, this percentage would give a total of over 6800 cars. Similarly with the other lines of trade classified it can be shown whether they represent good prospects or not.

Division of American Commercial Cars Into Classes

Division	Number of Firms Reporting	Number of Cars Reported	Average Number of Cars	Percentage of Total Firms	Percentage of Total Cars	Percentage Applied to Industry's 30,000 Cars
Miscellaneous	22	1,713	77.9	68.8	22.70	6,810
Express and Transfer	24	658	27.4	75.0	8.72	2,615
Breweries	19	641	33.7	59.4	8.50	2,548
Department Stores	18	605	33.6	56.2	8.02	2,403
Sightseeing and Buses	15	492	32.8	46.8	6.53	1,960
Gas and Electric Companies and Central Stations	4	373	93.2	12.5	4.95	1,475
General Manufacturing	15	331	22.1	46.8	4.40	1,320
Fire Apparatus	3	317	105.7	9.4	4.20	1,260
General Cartage	13	199	15.3	40.6	2.64	792
Wholesale Groceries and Commission	21	170	8.1	65.6	2.25	675
Meat Packers	11	162	14.7	34.4	2.14	643
Creamery and Dairy	15	118	7.8	46.8	1.56	468
Coal and Coke	10	110	11.0	31.0	1.46	438
Municipalities, Hospitals, etc	10	106	10.6	31.0	1.40	420
Furniture	14	104	7.4	43.7	1.38	414
Wine and Liquor Dealers	11	102	9.2	34.4	1.35	406
Laundry	2	72	36.0	6.3	0.95	285
Moving and Storage	11	70	6.3	34.4	0.93	279
Plumbing and Heating Supplies	13	69	5.3	40.6	0.91	273
Machinery and Steel	11	68	6.2	34.4	0.90	270
Building Materials	13	62	4.7	40.6	0.82	246
Delivery Contractors	1	61	61.0	3.1	0.81	243
Oils and Paints	11	59	5.3	34.4	0.78	234
Lumber	1	50	50.0	3.1	0.66	198
Milling Companies and Flour	6	50	8.3	18.7	0.66	198
Teaming	9	49	5.4	28.1	0.65	195
Government (Including Mail)	2	42	21.0	6.3	0.55	165
Street and Steam Railroads	3	34	11.3	9.4	0.45	135
Agents and Dealers	1	30	30.0	3.1	0.40	120
Jewelers	1	25	25.0	3.1	0.33	99
Newspapers	2	23	11.5	6.3	0.30	90
Textiles	1	22	22.0	3.1	0.29	87
Warehouse Trucks	1	21	21.0	3.1	0.28	84
Bakers	2	19	9.5	6.3	0.25	75
Wholesale Dry Goods	1	17	17.0	3.1	0.22	66
Hotel and Cafe	1	15	15.0	3.1	0.20	60
Lime and Cement Dealers	3	14	4.7	9.4	0.18	54
Ice and Ice Cream	4	13	3.2	12.5	0.17	51
Millinery	1	12	12.0	3.1	0.16	48
Banks	2	9	4.5	6.3	0.12	36
Pianos	2	9	4.5	6.3	0.12	36
Printers	2	9	4.5	6.3	0.12	36
Paper	2	7	3.5	6.3	0.09	27
Carpets and Rugs	1	6	6.0	3.1	0.08	24
Cigars and Tobacco	1	5	5.0	3.1	0.065	19
Undertakers	2	4	2.0	6.3	0.053	16
Hardware	1	4	4.0	3.1	0.053	16
Contractors	2	4	2.0	6.3	0.053	16
Importers	1	3	3.0	3.1	0.040	12
Confectionery	1	3	13.0	3.1	0.040	12
Library	1	2	2.0	3.1	0.026	8
Telephone	1	1	1.0	3.1	0.013	4
Taxicabs	1	1	1.0	3.1	0.013	4
Shoes	1	1	1.0	3.1	0.013	4
Art Dealer	1	1	1.0	3.1	0.013	4
Retail Grocer	1	1	1.0	3.1	0.013	4
Wall Paper	1	1	1.0	3.1	0.013	4
Totals, 57 Classes	350	7,544			100.000	30,000
Averages	6.14	132.4	21.55	19.1	1.754	526.3

The Injustice of Motor Truck Tire Guarantees

BY B. C. SWINEHART

THE guarantees made on motor truck tires at present are exorbitant and unjust. Years ago the user was entitled to a service guarantee for the reason that efficient fastening devices had not been developed. The majority of motor trucks were under-tired, and the spring suspension was poor, with the result that the user had to pay dearly for tire service, but of late tire construction has been improved to a degree that warrants a user securing a satisfactory service, providing he purchases from a reputable company, and his driver uses fair judgment in loading and driving.

The three parties vitally interested in truck tire guarantees are the tire manufacturer, the truck manufacturer and the user. The seven elements governing the length of tire service are material, workmanship, equipment, load, speed, road conditions and the driver, or his method of driving. In assigning to each party interested certain of these elements, the user really is more responsible for the amount of service that can be obtained than either the tire or the truck manufacturer.

With regard to material, exhaustive tests of material of different characters have been made during the past years, with the result that today tire makers are using compounds which in many cases are much better than those used eight to 10 years ago, even with lower prices.

The workmanship has been improved greatly and the designs of the tire have been changed so as to permit their carrying heavier loads; the systems of fastening devices and rim design for proper application have been improved, so that it no longer requires hours to make changes, and the tire is held more securely in the rim. All this has been the work of careful experts, who have been devoting years of work toward reducing tire cost a mile.

The truck maker is largely responsible for the equipment, as regards size of tires. In the past I have found many cases where the manufacturer turned out trucks which were under-tired. His responsibility in this, however, is limited, owing to the fact that many users specify the size of tire which they consider will accomplish their work best. The manufacturer is only partly responsible for the loads carried. He is to blame to a degree, however, for the reason that in making demonstrations he will carry excessive overloads in order to assure the customer that he has a good strong vehicle. In a recent case which came to my notice a truck manufacturer hauled seven tons of freight a day for two weeks upon a three-ton truck in order to demonstrate to the prospective purchaser that his truck would do the work satisfactorily. You readily can realize the strain which was thrown upon the tires. Often manufacturers will publish photographs of a new model truck carrying 100 per cent. overload, yet in selecting their tire equipment they provide for a normal load only.

The speed at which cars are operated is controlled to a certain degree by the design of the truck, but the truck manufacturer has little control of this feature after the vehicle leaves his hands. Excessive speed, under fair conditions, rests more largely with the driver.

I believe that the consumer, through the agency of his driver, really is responsible for loads carried. Overloading can be accomplished by a misplacing of the load; that is, in cases where heavy castings are hauled, it is not fair to place these at the extreme rear end of the truck, neither is it fair to place them to one side, as this will cause the tirest nearest the load to receive undue strains. Just as much care should be exercised by the driver in placing his load properly as he should use in not overloading the truck. Tires are designed to carry a certain load, and the factor of safety in design is very small. When a tire is overloaded it will break down under the load.

Speed is one of the most destructive elements entering into tire service, due to the excessive heat generated by internal friction. A truck tire designed to carry a stated load at 12 miles an hour will give a much smaller part of the required service if it be forced to carry the same load at a speed of 20 to 25 miles an hour. Driving a truck at excessive speed has the same evil effect that overloading has, in the event of striking a raised car track or other obstruction in the street. The blow which the tire receives is far beyond its carrying capacity, and the result is a bruise, or rupture, which in time will develop into a broken tire.

The user really is responsible for the road conditions, for the reason that he should instruct his driver to pick out the best route as regards road conditions, even though the distance may be greater. Economical tire service can be obtained even over bad roads, if the driver will use judgment in the speed at which he operates. There is a tendency among drivers to take the shortest route, irrespective of road conditions, feeling that the tires are guaranteed for a long service. The result is he will drive over streets strewn with broken bottles, old iron, stones, etc., which are certain to cut the tires, eventually resulting in the tires breaking up or going to pieces. One case which recently came to my attention was that of a large packing company operating several trucks. They permitted their drivers to take a short cut over four railroad tracks, which were not planked for crossings, in order to save a detour of one block. They maintained that the tires were guaranteed to cover a given number of miles, and they could not pick their roads as they must make a certain number of trips a day.

In considering the driver, I feel that he is really responsible for 60 per cent. of the tire trouble experienced by truck users. He is responsible directly to the user, and should work for his interests to the extent that he should spare the truck and tires as much as possible. A careful driver can get from three to six months' more service from a set of tires than a careless one, even though both cover the same route, and carry equal loads. Spinning the driving wheels when starting, or sliding them when stopping, does more damage to the tires than

10 to 25 miles of normal service. Driving in car tracks throws all the load on one side of the tire, and in the case of dual tires one tire has to carry all the load, resulting in an excessive overload for it. A careless operator can ruin the best set of tires made in 2000 miles by neglecting the usual instructions for operating.

The guarantees in force today are really interpreted as a guarantee that the tires cannot be destroyed in less than 8000 to 10,000 miles, as the case may be. It is true that tire manufacturers impose certain restrictions as regards overload, speed and driving in car tracks, but they have no means of learning to what extent the tire has been abused. In most cases, proper records of truck service are not kept, and the user simply guesses that he has not had sufficient service. Recently a user claimed that he was not operating his truck more than 20 miles a day. I took the trouble to drive over the route in order to check the distance. It measured 32.5 miles, and he usually made short trips during the afternoon, so that his tire mileage a day was nearer 40 than 20.

The tire manufacturer is responsible for workmanship and material, and has spent thousands of dollars in developing and improving both the construction and the material used, and I am satisfied that all reputable manufacturers are honestly trying to give dollar for dollar in service. The guarantee, from the maker's standpoint, is simply a wager that the tires will run a number of miles.

The truck manufacturer maintains that a long guarantee on tires aids him in selling his cars, as he can figure upon a stated cost a mile. This is true, to a certain degree, but as the truck maker assumes no responsibility in connection with tire equipment, I feel he should leave this matter largely to the parties most directly interested —the vehicle tire manufacturer and the user. The former is only indirectly responsible for the service that tires will give, for the reason that the matter of loads, speeds and road conditions are entirely in the hands of the user, through the agency of his driver.

The user is responsible for more of the elements conducive to an economical tire service than the other two together; he has direct control over loads, speed, roads traversed and the driver. Upon these four elements depend more than 75 per cent. of the responsibility for tires not giving average service. Since the elements surrounding the use of tires play such an important part in determining the length of service, it would seem only just and fair that the user should assume his share of the responsibility, and not demand that the tire manufacturer assume the responsibilities which really should fall to the former.

What Is the Manufacturer's Stock in Trade?

REPUTATION for reliability, good old-fashioned honesty, should be one of the motor truck manufacturer's chief stocks in trade according to A. R. Demory, vice-president of the Timken-Detroit Axle Company.

There is, perhaps, no business today which requires more honesty than commercial car making, insists Mr. Demory. Hard-headed business men, buyers of trucks, put the manufacturer to a severe test. His horseless vehicle must meet many exacting requirements. What will your truck do? How many pounds will it carry? What is its cost of operation a ton-mile? are some of the questions the inquisitive purchaser asks. Into the cost a ton-mile enter labor, fuel, oil, repairs, depreciation and all expenses. The repair and depreciation items are the ones which test the truck builder's integrity. To get repeat orders the commercial car manufacturer quickly learns that he must build the business man a truck which will not only be long lived but give the operator little trouble or concern.

To avoid the trouble which would give the truck a bad name and which would worry the owner thereof the manufacturer must use the best materials and insist on honest workmanship. In no part of a truck does the old saw "honesty is the best policy" apply more than it does in the bearings. They must be of tried and unfailing quality, scientifically hardened and fitted with closely ground bushings. It is essential that the wheel bearings be capable of withstanding the heavy shocks and end-thrust of rough roads. Every day service on corduroy streets, cobble stone pavements and in country quagmires will shake to the surface all dishonesty in manufacture.

The steering connections must be designed and manufactured so that they will not hammer out from the continued shocks of the millions of vibrations they get on the rough roadways. The power plant must be capable of continuous operation. In other words the heart of your truck must not stop beating no matter how heavy the load or how bad the streets. The school of hard knocks is teaching manufacturers how to build commercial cars which will carry the load at a cost the business man can afford to pay. Salesmen especially are impressing on the buyer's mind the saving in time. The truck cuts down the time from warehouse to destination. It takes the time-killing horse three times as long to cover the ground as it does the commercial car.

To sum it all up, the manufacturer who expects to stay in business cannot afford to be other than an honest manufacturer and the man who has hauling to do can no more hope to stay in business without the truck than he can without the telephone.

Fire Brigade.—Calcutta has an excellent fire brigade organization and has added a motor car service which has given entire satisfaction. The municipality is bringing from England a chief engineer to take charge of the brigade. Within a week seven assistant engineers at monthly salaries of $58 and seven firemen at $33 each have been added to the force. The rapidity with which motors can get to a fire recently enabled the brigade to extinguish several fires before they made much progress and it is said that the entire expense of the new brigade has been more than met by this saving. The present monthly cost of maintaining the brigade is about $2,300. The new fire engines were purchased in England.

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Amortization and Depreciation

WEBSTER defines amortize as clearing off, liquidating or otherwise extinguishing a debt, usually by a sinking fund, and modifies this with the explanation, to extinguish a premium or a discount involved in the purchase of a security by periodically charging off a portion of the premium or crediting a portion of the discount so as to bring the value to par at maturity, the transfer being made respectively from income to investment or vice versa. The same authority gives this explanation of the meaning of the verb depreciate, to lessen in price or estimated value, to lower the worth of.

In the case of a motor truck placed in the service of any business man or house, there can be no question of which word to apply, regardless of past or present practice in this respect. In fact, manufacturers who have taught users the idea of depreciation would do well to learn the lesson themselves and eliminate the word in the future. No maker pretends that his vehicle becomes of less value or usefulness as time passes, granting, of course, reasonable appropriations for its upkeep and repair. On the contrary, the more a merchant uses a truck, the more he learns to depend upon it, and thus the greater becomes its value to him. From this point of view it can not possibly depreciate.

To look at its purchase on the other hand, from a business standpoint, there is no question of doubt in the correctness of the statement that the original cost price is a debt incurred for the betterment of the business, it is a debt whether so-called or not for the merchant takes this money out of his regular business and thus prevents its use as a medium of exchange. This being the case, it is advisable to clear off this debt, as any other would be paid, by means of a sinking fund, which is accumulated not at a single appropriation but by means of a series of yearly payments spread over a term much shorter than the actual life of the article.

Thus, in the case of a brick building 25 years is taken as its amortization period, consequently four per cent. of its original cost and interest on the balance is written off each year. As a matter of fact, the life of ordinary brick factories is several times 25 years, so that after the original debt has been extinguished and a sufficient surplus laid aside to replace it at any time, the building continues to last for another generation.

The same method should apply to motor vehicle amortization, insofar as the life may be made as long as is desirable. In the replacement of any debt however, it is advisable to use as much speed as is consistent with the profit being made. It would be foolish to replace a truck purchase or debt of this kind out of capital, hence the amount of profit will determine the amount carried to the truck amortization fund. The majority of firms consider a period of between five and eight years as an excellent one for this purpose. The former gives an annual contribution to the truck repurchase fund or amortization surplus of 20 per cent. while the latter equals 12.5 per cent. a year.

Whatever the amount utilized, it should be considered as an amortizement and not a depreciation, for as some one has ably put it, the life of my vehicles is anything I care to make it. Hence the depreciation is negligible and the use of that term in such a connection an error. As the idea of depreciation carries with it the idea of faulty workmanship or material with excessive wear, it should be abandoned in favor of the more correct term.

* * *

Pending Restrictions of Motor Vehicles

In one of the commonwealths there is now being discussed a bill which a properly constituted highway commission has prepared. This limits the carrying capacity of trucks, their speed, the width and general forms of the tire surfaces and specifies that their owners shall be liable legally for any damage done to the public roads. Viewed in the abstract, this is class legislation of the worst possible kind, for it would limit the design and construction of motor vehicles to those few forms with which the originator of the bill happened to be familiar.

The passage of this restriction would work a hardship upon a number of firms which are now building heavy vehicles in that it would be impossible for them to make a legal sale in that state; with smaller, lighter wagons of the delivery type, the speed restriction would eliminate the possibility of the vehicle competing with the horses, inasmuch as the allowed maximum is so low as to prevent the vehicle earning relatively more than the horse in the ratio of their two initial costs; the tire restrictions provide a minimum load for each inch of tire width which is exceeded on practically two-thirds of the cars now in use, while restricting users to a certain kind of tire. In fact if the legal authorities should construe the side retaining flange of applied tires as a projecting flange within the meaning of the bill, this form of tire would have to be abandoned. In making the most unjust provision that owners or users of vehicles should be held responsible for surface or other damage, the commission would impose a double tax upon the motor truck user; the first paid in county and state taxes, and registration fees, from which two sources the majority of road building and maintenance money now comes, and the secondary damage tax which it is proposed to levy.

This, in substance, would be causing automobilists and motor truck users to construct with their own money a highway for all the people and then be charged a fee to use that which they themselves paid for. A consideration of this obnoxious bill will show that it was brought forth either in ignorance or misplaced enthusiasm and that it never should become a legal measure. To this end all vitally interested in the motor truck business should get together and oppose it to the limit. Insofar as the same measure would tax the teaming and wagon interests in the same manner, they have begun to unite and act concertedly against it. With a showing of opposition of the part of commercial vehicle manufacturers this bill will never become a Massachusetts statute, while with this in the books there is no telling to what lengths other states would go along similar lines. It must be defeated.

Another thought in this connection is that starting this matter of regulation of truck design and construction, which it amounts to in the last analysis, there is no telling where it may end. While the revised Massachusetts provisions are not so objectionable as they were, another state might put through a bill of considerable less fairness.

* * *

What Will the Future Shows Be?

With the close of the last big display of motor trucks for 1912, the question naturally arises, what of next year's shows? To answer this question is extremely difficult, but it brings in so many variables that to forecast twelve months in advance is much like making a guess. It is reasonable to assume that so long as there are trucks built there will be some form of annual exhibition at which the different forms may be compared and analyzed.

The second thought in connection with this matter, that is after granting that there will be shows of some kind, not only next year, but the season after that and for many to come, is will they be of the same or a different nature. If the industry advances and there are many more added to our already long list of builders, it will not be long before there will be so many desiring to exhibit that no building or group of contiguous and available buildings will hold them all.

Then, with the necessity for one or more divisions, arises the interesting speculation, how will this be done? There is the possibility of having a segregation not unlike the French with their *Petit Poids Lourds* and *Poids Lourds,* that is light heavy weights and heavy weights, or in English, light delivery wagons and heavy trucks. This being the case, it would become necessary to draw a line of limit of capacity for the former. Moreover, a week for light vehicles and another for the heavy ones with a possibility of accommodating 75 makers and 200 cars the first time and 175 vehicles the second, would not give all of the industry a chance. This would call for a third division, which makes the scheme less desirable.

In connection with the necessity for demonstration to deeply interested prospective purchasers, much space outside of a show of this kind is necessary, this increasing with the size of the display. At once this brings to mind the agitation of a couple of years ago for an open air exhibition, where each firm could have all of its vehicles operating under their own power. Such an idea seemed good and appropriate several years ago, why not now when the industry has grown enormously and is still progressing at the same rate? The proposed outdoor display for the city of Chicago next fall will be watched with much interest as a reasonably good straw to show which way the truck manufacturers' wind would blow on this show question. At that, it is proposed to give each and every firm half an acre, or approximately 20,000 square feet. There are many other possibilities in the commercial vehicle show line, but of them all the outdoor proposition seems to have the greatest number of advantages, if only manufacturers, agents and dealers and users will agree upon its advisability.

* * *

Cost of Different Types of Driver

As a result of some recent experiments with a heavy truck by an expert driver and one with little or no previous experience, the statement has been made, and from an unquestionable source, that there is a difference between the two of 34 per cent. in fuel and oil consumption. On the average three-ton truck installation, the gasoline bill will run approximately $20 to $25 a month, varying with the locality, driver, etc. Similarly with oil and other lubricants, the total will be about $4 to $6. The two together will amount to from $24 to $31.

Now, if the expert can handle the car on the lower figure, the amateur or converted horse driver would add just $8.00 to $10.30 a month. The former would carry also better care of the vehicle as a whole, and a lessened amount of wear and tear as well as delays. Consequently, the difference of $2 a week upwards can not be considered as the whole loss or even half of it. Viewed in this light, it becomes an open question as to whether the lower wage for which the horse driver will work coupled with his knowledge of traffic conditions is a better investment than a trained chauffeur who must perforce learn all about delivery work and traffic, and that, too, at a somewhat higher wage each week during the entire learning period.

As a matter of fact, a saving of even $3 a week on the driver's salary ($156 a year) is a small amount compared with that which would be caused by a seized cylinder and the consequent expense and delay, the latter being of more value than the mere mechanical part. This new statement gives the merchant some interesting food for thought.

* * *

This office would like to secure a copy of the June 18, 1911 issue of Motor Traction (English) for binding purposes. The publisher is unable to supply the same, and any American firm or person willing to do so, may exchange it for any past or present number of the COMMERCIAL VEHICLE or this office will purchase it.

Late News of the Month

Standards Discussed by Truck Manufacturers—Progress of Highway Restriction Bill—Legal Tangles—Taxicab Company Sold—Hewitt Absorbed By International—Other News Items of Interest

NEW YORK CITY, March 23—One of the most important meetings ever held in the interests of the commercial vehicle was that of the National Association of Automobile Manufacturers, held here recently. This was a gathering of engineers, manufacturers, salesmen and others interested in motor trucks, and the topics discussed and standards set were of far-reaching importance.

Speeds, loads, body weights, maintenance guarantees and other items were discussed. A committee, which had done much work previously on these subjects reported, and as a result of the adoption of and debate on this report, the following lines of work were agreed upon:

1. Standard maximum speed ratings of trucks of different capacities, with load.
2. Uniform weight allowances for bodies of the simplest form regularly catalogued for trucks of different capacities.
3. A standard form of warranty covering defective work or materials for 90 days after delivery of the machine to purchaser.
4. The standard of dimensional tolerances on wheel felloe bands recommended by the technical committee of the Society of Automobile Engineers in its report of February, 1912.

The speed ratings and body allowances were recommended as follows:

Tons—	Miles an hour.	Std. body (pounds).	Total Ld. & std. body (pounds).
½	16	500	1,500
1	15	600	2,600
1½	14	700	3,700
2	13	800	4,800
2½	12	900	5,900
3	11	1,000	7,000
3½	10½	1,100	8,100
4	10	1,200	9,200
4½	9½	1,300	10,300
5	9	1,400	11,400
6	8	1,600	13,600
7	7	1,800	15,800
8	6	2,000	18,000
9	5½	2,200	20,200
10	5	2,400	22,400

The conference also spent considerable time in discussing guarantee practice and endeavoring to arrive at an ideal guarantee which might be adopted generally. The form of warranty finally recommended follows the standard warranty on touring cars, with such changes as will make it apply to trucks, such as an additional proviso requiring that any failure of parts claimed to be defective shall not be due to abnormal use, misuse, neglect or accident occurring after the motor truck has been shipped to purchaser. Another clause was inserted making the guarantee void if it be operated at a speed in excess of its factory-rated speed, or if it be loaded beyond its factory-rated capacity.

All these were submitted to the executive committee and adopted, but numerous other points were discussed upon which further inquiry was thought desirable. Among these were the following:

1. Uniformity of practice regarding demonstrations and charges therefor.
2. Secure data on widths and lengths of frames back of seat with a view to future standardization and interchangeability of bodies.
3. Secure data on frame and platform heights from the ground, with a view to possible standardization with relation to railroad car floors and loading platforms.
4. Secure data on wheel sizes and their relation to tire mileage.
5. Obtain information regarding street conditions in different cities with regard to tire mileage as related to grades and surfaces.
6. Investigate foreign trade matters, such as sizes of wheels, tire mileage, demonstration charges, etc.

Those present at the meeting were:

S. D. Waldon (Packard), presiding; W. E. Metzger (Metzger and Everitt); Charles Clifton (Pierce-Arrow); Benjamin Briscoe (United States Motor); B. A. Gramm (Gramm); F. I. Harding (Peerless); H. Kerr Thomas (Pierce-Arrow); G. J. Loomis (Speedwell); Vincent Link (Universal); M. T. Pilcher (Federal); Albert L. Pope (Pope); W. C. Walker (Pope); C. E. Stone (Gramm); P. K. Hexter (Gramm); A. M. Chase (Chase); E. O. Sutton (Knox); A. W. Robinson (Locomobile); A. J. Doty (Lansden); Will H. Brown (Mais); Walter C. White (White); H. F. Flowers (American Locomotive); Peter Dumont (Baker); H. S. Diller (Lauth-Juergens); Morris Grabowsky (Alden Sampson); H. S. Stebbins (General Motors); C. H. Wallerich (General Industrial and Manufacturing Company); Herbert G. Streat (Knickerbocker); F. F. Lewis (Knickerbocker); J. T. Langhorne (Packard); E. W. Curtis, Jr. (General Vehicle); William P. Kennedy (American Locomotive and Baker); F. Nelson Carle (General Vehicle); Alfred Reeves (United States Motor); D. Beecroft (Class Journal Company); S. V. Norton (B. F. Goodrich Company); C. W. Fletcher (Walter); G. A. Hodges (International); David S. Ludlum (Autocar); George H. Kelly (Baker); H. E. Coffin (Hudson) and R. D. Chapin (Hudson).

PROGRESS OF HIGHWAY RESTRICTION BILL

(Special Telegram)

BOSTON, March 27—The Committee on Roads and Bridges of the Massachusetts Legislature has voted to report a bill based on the recommendation of the Highway Commission limiting the weight and speed of motor commercial vehicles which may use the roads and bridges of the commonwealth. The bill provides a limit of six tons for vehicle and load that may pass over a bridge in a town unless a permit is secured from the town, county or state authorities having control of the bridge. Notice is to be posted at both ends of bridges upon which the load limit is six tons. For bridges in cities the load limit is set at 12 tons, anything over 12 tons, including vehicle and load, must have a permit. In other words, no permit is needed in the cities for loads up to 12 tons; the bill further provided that for trucks which, with their load, weigh from four to eight tons, the speed limit shall be 10 miles an hour and for trucks that weigh, with their load, in excess of eight tons the speed limit shall be eight miles an hour. There is also a provision limiting the load to 800 pounds an inch width of tire, as suggested in the original bill of the Highway Commission. The committee also proposes to change the registration fee for motor trucks. At present the fee is a flat rate of $5. Under the new bill the fee will be graduated according to horsepower, ranging from 30 cents a horsepower for small trucks of five to 19 horsepower to $1 a horsepower for trucks of 50 horsepower and over.

COMMER IN FRIENDLY RECEIVERSHIP

NEW YORK CITY, March 15—The trade in this city was considerably startled last week at the announcement that a receiver had been asked for by creditors of Wyckoff, Church & Partridge, Inc., manufacturers of the American Commer truck under license from the parent English firm. This firm has extensive works at Kingston, N. Y., and Sharon, Pa., at which latter place, it is understood, large numbers of the trucks were in the course of manufacture.

It is explained that the receivership is a friendly one, the preliminary estimate of the business showing assets over $590,000, while the liabilities are less than $650,000 with $250,000 of these secured. The three claims which were pressed for payment totalled but $20,000, and John S. Sheppard, Jr., receiver appointed by Judge Hand, has received permission to issue that amount in certificates payable in three months, the money being used to continue the business.

NEW YORK TAXICAB COMPANY SOLD

New York City, March 26—A proposition to dispose of the taxicabs owned by the New York Transportation Company to the Connecticut Taxicab Company, together with the stations, rights, garage, machine shop and other property of the former associated with its taxicab branch, was submitted to the stockholders of that company Monday at a special meeting called for that purpose and adopted. Over 600 cabs are included. The sale does not include the Fifth avenue 'bus line nor any of its equipment.

Tuesday afternoon representatives of the Fifth avenue line appeared before the Public Service Commission to urge that body to grant it permission to extend its route from Fifth avenue to Seventh avenue so as to connect the terminus of the Hudson tubes with the Pennsylvania station. In case this is granted the new service will require 20 more 'buses.

NEW CONCERN ADOPTS INTERNAL GEAR

Indianapolis, March 20.—On the first model of the General Industrial & Mfg. Co., of this city, a 1500-pound delivery wagon, it is announced that the internal gear type of drive will be used. This is the first announcement of this concern which was formed recently with C. H. Wallerich, formerly assistant general manager of the Mais Motor Truck Company, as general manager of the motor vehicle department.

This firm also announces the manufacture of a new speed governing device with a signal like a siren horn in connection as a feature of the delivery car. This is so constructed that when the limiting speed has been reached the whistle sounds warning the driver against further speeding as well as safeguarding the public.

SYRACUSE SHOW ENCOURAGES DEALERS

Syracuse, N. Y., March 23—At the fourth annual automobile show, the largest yet held under the auspices of the Syracuse Automobile Dealers' Association, a preeminent feature was the showing of commercial vehicles, 12 in number, which occupied divided space at the Armory and Alhambra, for the show occupied two large buildings on the South and North Sides, respectively.

The dealers were much encouraged after the show by the prospects for commercial vehicle sales in central and northern New York. It was the most successful show for commercial vehicles since this city began holding exhibitions. Moreover, it was the largest, for there are many more agencies here for commercial vehicles than there were a year ago.

INTERNATIONAL COMPANY ABSORBS HEWITT

New York City, March 5.—It was announced from the offices of the International Motor Company that this firm had acquired the properties of the Hewitt Truck Company and that all business of the latter would be taken over immediately. The sales and executive departments will be amalgamated, while the Mack works at Allentown, Newark and Brooklyn, the Saurer factory at Plainfield and the new Hewitt plant in New York will each be continued. The complete range of sizes which the organization offers will be from 1500 pounds to 10 tons with different types of construction.

PLAN A SINGLE TRADE ORGANIZATION

New York City, March 15—If plans which are now well under way, do not fall through, there will soon be but one large trade body in the commercial vehicle and automobile industries. The scheme is no less than the consolidation of the Automobile Board of Trade with the National Association of Automobile Manufacturers. The membership is now largely the same and the purposes of the two are common. A tentative plan has been discussed by committees from both bodies and it is expected that a mutually agreeable scheme of consolidation will be reached very shortly.

GRAMM PLANT SOLD TO WILLYS

Toledo, March 26—On yesterday the pending deal for the sale of the controlling interest in the Gramm Motor Truck Company, Lima, O., to John N. Willys, head of the Willys-Overland company, with a huge factory in this city, was consummated. Although the purchase price was not announced, it is understood this was one of the largest deals ever pulled off in the automobile business. B. A. Gramm will remain with the organization, the sales end of which will be taken over immediately by the Overland sales department.

DONALDSON IN CONSULTING WORK

New York City, March 26—Henry F. Donaldson, president of the Society of Automobile Engineers and former editor and publisher of the Commercial Vehicle, and Joseph Tracy have associated themselves as automobile engineers to undertake consultation, research and development work, design and construction, laboratory and road tests. For the present the headquarters in New York will be in the office already established by Joseph Tracy at 116 W. 39th street. The testing laboratory in New Jersey will be maintained as heretofore.

GOODRICH COMPANY DECLARES DIVIDEND

New York City, March 19—The B. F. Goodrich Company, well-known maker of solid tires for commercial cars, as well as for other vehicles, this week declared a stock dividend of $26,000,000 and a cash dividend of 78 per cent. The former is equal to 270 per cent. on the common shares. This amount is a part of the huge surplus which this successful concern has amassed.

DECATUR TRUCK CONCERN REORGANIZED

Grand Rapids, Mich., March 21—The Decatur Truck Company, now of Grand Rapids, has been reorganized since moving here under the name of Grand Rapids Motor Truck Company. The new concern is capitalized at $600,000 and has many of the Furniture City's best business men in its organization.

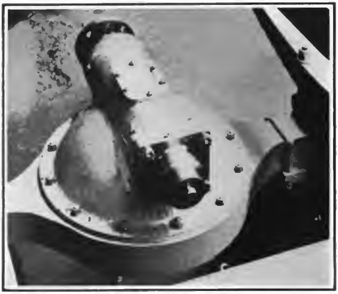
The North of England Show at Manchester

LONDON, March 1.—After some little hesitation, both this year and last, as to the choice of the City Hall or the Exhibition building at Rusholme, the choice fell to the latter for the second time, and from the 16th to the 24th of February, a mixed motor show was held there. About 20 different makes of commercial cars were shown, four of them being steamers. America was represented by three models of White trucks and by the 20-horsepower Ford, whose maker now has works at Trafford park, near Manchester.

One of the most interesting of the all-British stands was that arranged by Belsize Motors, Ltd. This maker showed a light 10-12-horsepower delivery wagon; 14-16-horsepower cab chassis, 18-horsepower, 30-cwt., and 28-horsepower three-ton wagons, all worm driven, as far as final transmission is concerned, with the exception of the 18-horsepower model. The 10-12-horsepower four-cylinder is an entirely new model for 1912.

As usual, Leyland Motors, Ltd., staged four vehicles: a four-ton gasoline truck for carrying mineral waters, it being a sixth repeat order from Jewsbury & Brown, Manchester. It carries a platform 12.5 by 6.5 feet and has a canopy over the driver. The engine is a four-cylinder one of 40 horsepower, with dual ignition, the drive being through a gearset with four speeds forward to a bevel driven back axle. Leylands intended including one of the three-ton 30-horsepower trucks, which forms the thirty-fourth repeat order received from the War Office, but could not get it ready in time, so put in its place one of the five 55-horsepower motor fire engines fitted with turbine pumps which was built for the London County Council—this commanding a great deal of attention. The third Leyland staged was a char-a-banc, of 40 horsepower, it being the fourth going to S. Camacho, Santa Cruz, Teneriffe. H. C. Faulkner & Co., of Water street, Manchester, are the owners of the fourth Leyland, it being the fourth repeat order, and is a 40-horsepower five-tonner. It is fitted with what are called flats, which are taken out and unloaded while the vehicle may be off with a load of bales, and upon its return the re-loaded flats can be replaced in three layers somewhat like a nesting body.

Clayton & Co., Ltd., was the only firm showing a commercial chassis, with the driver's seat over the engine. The company, however, makes both types. The chief exhibit was a 22-seated 30-horsepower char-a-banc, which had just come back from a six weeks' publicity tour.

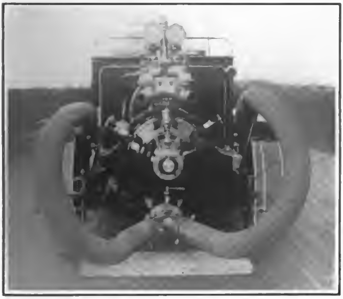


Rear Axle and Worm Gear Casing on New 1.5-Ton Maudslay Truck

Next but one to this stand Halleys' Industrial Motors, Ltd., staged a 60-70-horsepower six-cylinder fire engine, three and two-ton trucks, and an up-to-date motor char-a-banc. Two entirely new commercial chassis were shown by the Maudslay Motor Company, including the 17-horsepower 30-cwt. type, and the three-ton 30-horsepower model. Both have worm gear for final transmission, the reduction in both models being 7.75 to one. The 30-cwt. model can accommodate a 12.5-foot body and the three-tonner one of 13.5 feet. The back axle is one of

The Belsize Exhibit at Manchester, with a Well Balanced Line. Note the Simple Character of Decorations and Enormous Signs the most interesting features of both machines, it being made of a solid steel forging. This has a loop in the center into which is bolted the box containing the differential and worm drive. The fixed axle carries the load and is bored to accommodate the two halves of the live axle on either side. A great advantage of this back axle design is that the worm gear can be removed for inspection without the necessity of jacking up the vehicle or removing the road wheels.

One of the best known Scotch makers—the Albion company—was represented by the Manchester agent with three models—all repeat orders—the 32-horsepower char-a-banc being one of the exhibits. Provision is made for 30 passengers on this vehicle. One of seven three-tonners supplied to a Cardiff brewing firm formed the second exhibit, and a light wagon with box body the third. All are chain driven and are entirely built, even to the magneto and carbureter, by the Albion company.



Rear View of Leyland Fire Engine Showing Centrifugal Pump

Another firm with a trio of machines, which was a little cramped for room, was that of the Lacre Motor Car Company, Ltd. This exhibit consisted of a one-ton two-cylinder 18-horsepower vehicle; a two-ton 30-horsepower machine, and a five-ton 38-horsepower chassis, all chain driven. These Lacre vehicles are sold in 18 different models, and those exhibited attracted a great deal of attention but were at a disadvantage for want of room, which the makers have been unfortunate in not getting these last two years.

A good deal of attention was given by the public to one of the four vehicles on the stand of Dennis Brothers, Ltd., who are the pioneers in the use of the worm drive. However, the vehicle of this make which attracted much notice was a 35-horsepower police patrol, with accommodations for 14 prisoners. The vehicle has an aisle down the center for the attendant to patrol, and after the show will be delivered to the Salford (Manchester) authorities. Dennis also staged a 55-horsepower four-cylinder fire engine with turbine pump of 350 gallons capacity, it being a repeat order from the Bradford Corporation. A five-tone 40-horsepower truck and a 35-horsepower char-a-banc—the seventh repeat order from a purchaser—completed the Dennis group.

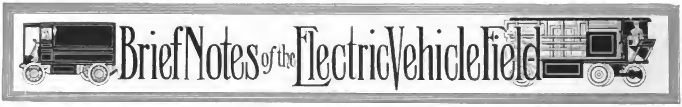
The Commer Car models shown at Manchester, which are now so well known in the States, were a 23-seated char-a-banc and a 26-horsepower three-ton truck; while J. & E. Hall, Ltd., who make the Saurer model under license in England, showed a 38-horsepower five-tonner, for Vickers, Sons & Maxim, Ltd., and a three-tonner.

One cannot but close these notes without drawing attention to the steady progress which the unique K. T. pneumatic tire is making. It held a prominent place amongst the accessories at Rusholme, and was seen also on fire engines and similarly fast commercial cars.

Manchester is the only center at which anything in the nature of a business car show is held in England or Great Britain, as since 1908 the S. M. M. T. has abandoned the idea of a London show.

Business in the engineering lines in Birmingham has been much improved for the past 12 months, especially those firms engaged in the manufacture of automobiles and their accessories. These have had practically full employment, and though in other lines conditions have been better they have not been up to the motor trades.

Newest Maudslay 1.5-Ton Truck Shown for First Time at Manchester. Note Worm Drive and Steel Wheels, Especially the Reare



Brief Notes of the Electric Vehicle Field

More Electric Orders for Express Companies

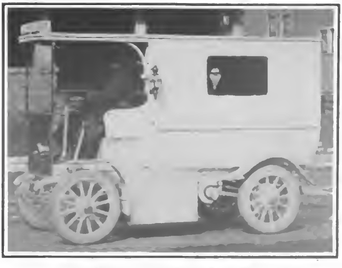
FOLLOWING an order three months ago for electric vehicles of the General Vehicle make, to be used in Boston, and 25 3.5-ton carriers of the same make for New York City, the American Express Company recently placed a reorder with this concern for 20 two-ton trucks and three 3.5-ton vehicles.

The electric truck seems to be meeting with great favor with the large express companies throughout the country. The Adams Express Company has recently placed large orders for electric machines, and on Friday March first the New York Transportation Company, which is known to many as Dodd's Express, placed another reorder with the General Vehicle Company for three 3.5-ton machines. The large teamsters of the country are all looking to the great express companies, as they realize that with their superior engineering departments they are able to determine the best and most economical methods of transferring the heavy loads.

Ambulance and Invalid Carriage of Baker Make

As showing the most up-to-date construction in ambulances and invalid carriages, the illustration herewith depicting a recent product of the Baker company is noteworthy. The view presents the general side appearance and a patient within, and gives an excellent idea of the utility of the vehicle while at the same time pointing out its impressive appearance.

Among physicians and undertakers the electric is winning a wide popularity, the Boston show, for instance, revealing no less than six of the vehicles, of which four were battery-driven, among them the one illustrated. Electric ambulances are rapidly winning a wide popularity among physicians and undertakers. The physician appreciates the advantages of the electric ambulance and invalid carriage not only because it is speedier than the horse, but also because it is sanitary, safe and silent. As may be seen from the picture, the Baker carriage has all manner of equipment calculated to win the approval of the critical physician. What especially commends the electric is its ready adaptability to all manner of electrical equipment, such as extension lamps, warming pads, water heaters, etc. Such appliances may be installed easily in an electric, and are obviously of immense practicability and utility. These appliances may be operated by means of the storage battery which runs the car and the current which they consume is inconsiderable.



Baker Electric Ambulance and Invalid Carriage

When equipped with pneumatic tires, the ambulance has a speed rating of 18 miles an hour. The body rests on the 1000-pound chassis. The interior arrangement is such that two patients may be carried at one time, with plenty of room left for two attendants. One patient is placed on a rigid frame cot which rests in a runway on the floor; the other patient may be carried in the stretcher which is suspended from an unique spring hanger. The interior is finished in enamel white and all cracks and crevices in flooring and sides have been eliminated to facilitate proper sanitation.

Electrics Deliver New York's Yeast

There is no end to the number of uses for which commercial vehicles, and in particular the battery-driven form, are being found applicable and economical. During the recent Chicago show the Waverley people received an order from the Fleischmann Company of New York City for 10 light delivery wagons of the shaft-driven type as illustrated in the picture on the facing page. A few days later this order was duplicated, making a total of 20. The purchase of these cars by a conservative firm like the Fleischmann is significant because it points out that there must be real economy in the small electric car, despite the unusually short trips, many starts and stops and low competing horse costs.

Many Electrics Do Good Government Work

It is surprising to many persons who have not followed the matter very closely to know what a large number of vehicles are now in the service of Uncle Sam, and in particular in the collection and delivery of mail. In New York City, for instance, an unusually large number is utilized in this manner, while Detroit, Indianapolis, Washington, Chicago and other cities are making additions to the Government fleet of mail wagons at all times.

In a lecture delivered in New York City recently, a well informed electric vehicle man delivered the following remarks which bear upon this subject, and consequently are of interest:

> It is noteworthy, showing what can be done, that the commercial cars now performing the most exacting service anywhere in the world are electrics, and their design evinces a more than ordinary appreciation of real automobile engineering, and what really takes place when a heavy self-propelled vehicle travels at good speed over all kinds of pavements, in all weathers, and with all kinds of drivers. Such machines in general

Light Waverley Delivery Wagon for Yeast Concern

are of the wheel-steer, single-motor, double side chain drive form, ranging from 1000 to 4000 pounds capacity.

Vehicles of this type handle United States mail between post office substations and railroad terminals, etc., penalizations being imposed for any delay over two minutes. In two years these wagons, one always in reserve and one being overhauled, covered 689,819 miles, this being almost 40 miles a day a vehicle, counting the whole 26. In summer the mileage is minimum, reaching its maximum at Christmas, when the wagons are often in continuous service the whole 24 hours, changing drivers and batteries every eight hours. The total loads carried at this time are five times the actual capacity of the wagons. For this extraordinary "limit" service the cost has proved to be for:

	Tires a mile.	Lead Batteries a mile.	Current at $0.04 a KWH
1000-lb. wagons........	$0.0076	$0.0221	$0.0211
2000-lb. wagons........	.0103	.0260	.0224
4000 lb. wagons........	.0218	.0404	.0258

Total average cost of tires, batteries and current..................$0.0658

Three makers of tires and two makers of batteries figured in this compilation. The current was all central station, Edison service.

Electric Light Company Adds Vehicles

No one concern has more cars, nor half as many electrics, in the city of Chicago, than the Commonwealth Edison Company. Recently this firm sent out specifications for bids on an addition of 25 cars to its fleet. As showing the results of its long and varied experience, which has been set down in a painstaking and logical manner so as to be capable of analysis, the specifications themselves are of wide interest. The man without experience, but in the market for an electric vehicle of the capacity mentioned, can utilize these in the purchase of his car, and thus save himself some serious troubles later by buying a car which is unfitted to his work.

The 25 vehicles were divided into six classes, according to carrying capacity and character of service, as follows:

No. 1—Eight vehicles for the stores department, each to have a carrying capacity of 4000 pounds, 95-inch wheelbase and canopy cover.

No. 2—Two vehicles for the stores department, each to have a carrying capacity of 1000 pounds, 76-inch wheelbase and panel cover.

No. 3—One vehicle for the street department, to have carrying capacity of 4000 pounds, 95-inch wheelbase and frame cover.

No. 4—Eight vehicles for the street department, each of 4000 pounds carrying capacity, 106-inch wheelbase and frame cover.

No. 5—Five vehicles for the customers' repairs department, each of 4000 pounds carrying capacity, 106-inch wheelbase and frame cover.

No. 5—Five vehicles for the customers' repairs department, each of 1000 pounds carrying capacity, 76-inch wheelbase and panel cover.

No. 6—One vehicle for the sign department of 1000 pounds carrying capacity, 95-inch wheelbase and frame cover.

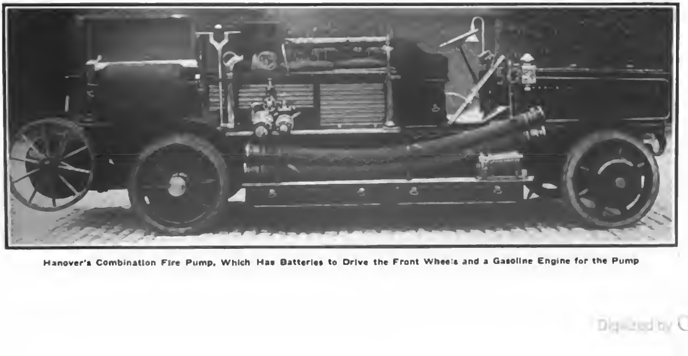
All vehicles must develop a mileage of 40 miles with lead battery or 50 miles with Edison battery on one battery charge. The speed requirement is from 12 to 14 miles an hour on level, smooth pavement when carrying half the rated load. Lots 2, 5 and 6 of those enumerated above may be equipped with any number of lead cells, from 40 to 44. In case an Edison battery is used, 60 cells shall be furnished with each vehicle. Bids on both lead and Edison batteries must be furnished in each class. Each vehicle must be provided with headlight, taillight, odometer, Sangamo ampere-hour meter, foot-operated gong, charging plug with connecting lead, hood and curtains for protection of driver, and the necessary repair tools. Additional information may be obtained from the chief operating engineer of the company. The bodies of the vehicles have been specially designed for the requirements of the various departments, and blueprints accompany the specifications, although considerable latitude is allowed as to the chassis.

Peculiar Combination Electric Vehicle

The illustration below shows an unusual combination fire vehicle, which has a separate gasoline engine to drive the fire pump, while the machine itself is propelled by means of electricity with batteries as a source of power. This peculiar piece of apparatus comes from Germany, where the electric is making great strides; in fact, it was made and is in active use in Hanover. The steel wheels will be noted as well as the long bonnet which covers the batteries, the balance of the vehicle being along more conventional lines. The idea of concentrating the heavy battery weight over the front wheels lies in securing better traction, those members doing the driving.

Electric Vehicles for Revere Rubber Company

Another of the country's larger industries has fallen in line with the adoption of commercial vehicles for all trucking service by the Revere Rubber Company, of Revere, Mass. This concern has decided to adopt electric transportation of all its goods from Revere to Boston, and with that idea in view has placed a large order with the General Vehicle Company for 3.5 and 5-ton trucks.



Hanover's Combination Fire Pump, Which Has Batteries to Drive the Front Wheels and a Gasoline Engine for the Pump

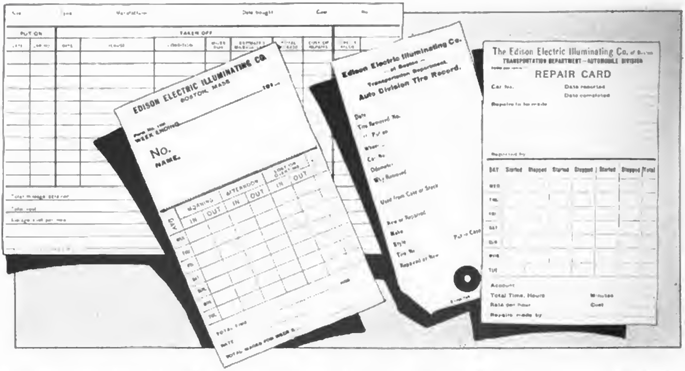
Boston's Ideal Electric Service Stations

Details of the Garage and Charging Stations Which Have Been Established in This New England City Under the Supervision of a Committee of the Electric Vehicle Association of America—Blank Forms Used

THE present healthy aspect of the electric vehicle situation in Boston is due in no small measure to the energetic campaign that the Edison Electric Illuminating Company has been carrying on for the past year. The Edison company had current to sell, it had current to sell at a time during the day when there was little demand for it. What sort of customer could use it during that period? the officers asked. And the answer was: The electric automobile. Consequently the Edison company got together the dealers in electric cars and trucks and a campaign was laid out that included co-operative effort on the part of the Edison company as a manufacturer of current and as a user of vehicles, and the dealers and manufacturers of vehicles. That campaign has been in progress only a twelvemonth, but it has put the electric vehicle business on its feet and given the electric the place it ought to have in the motor vehicle trade of Metropolitan Boston.

One of the first needs that was felt by the dealers in electric trucks particularly was some place where trucks could be garaged—stored, cleaned, repaired and charged—some place convenient for the business house in the downtown section. In discussing the purchase of electric trucks the salesmen were often confronted with the question of recommending some place where the truck could be kept, and there were few satisfactory and convenient places in the city. The Edison company took this up and found that it had a building on Atlantic avenue near the foot of Pearl street that would be very satisfactory for electric truck garaging purposes. The building had been used by the company for garaging its own vehicles, it was of concrete, easy of access from all parts of the business district, and as convenient as possible to the large railroad and steamship freight terminals. Consequently on April first last year the company opened the garage at 476 Atlantic avenue with a capacity for between 25 and 30 trucks and placed it in charge of an expert garage man and an expert electrician. All the necessary apparatus for electric vehicle service was installed.

That the experiment is a success is easily proved by the fact that the company has had plans made and proposes shortly to carry them out for the enlargement of the garage so that it will accommodate between 75 and 90 trucks. An addition to the building that has been used for other purposes is to be taken and turned into the garage. The latter is filled now to its full capacity with privately owned trucks, the Edison company storing its vehicles elsewhere. In some cases the purchaser of a truck uses the Edison garage only until his operator is



Date bought

Cost

PUT ON

TAKEN OFF

EDISON ELECTRIC ILLUMINATING CO.
BOSTON, MASS
191..

WEEK ENDING

No.
NAME.

DAY	MORNING IN	MORNING OUT	AFTERNOON IN	AFTERNOON OUT	IN	OUT

Edison Electric Illuminating Co.
of Boston —
Transportation Department.
Auto Division Tire Record.

Date
Tire Removed No.
" Put on
Wheel
Car No
Odometer
Why Removed
Used from Case or Stock
New or Repaired
Make
Style
Tire No
Repaired or New

The Edison Electric Illuminating Co.
TRANSPORTATION DEPARTMENT—AUTOMOBILE DIVISION
REPAIR CARD

Car No.
Date reported
Date completed
Repairs to be made

Reported by

DAY	Started	Stopped	Started	Stopped	Started	Stopped	Total

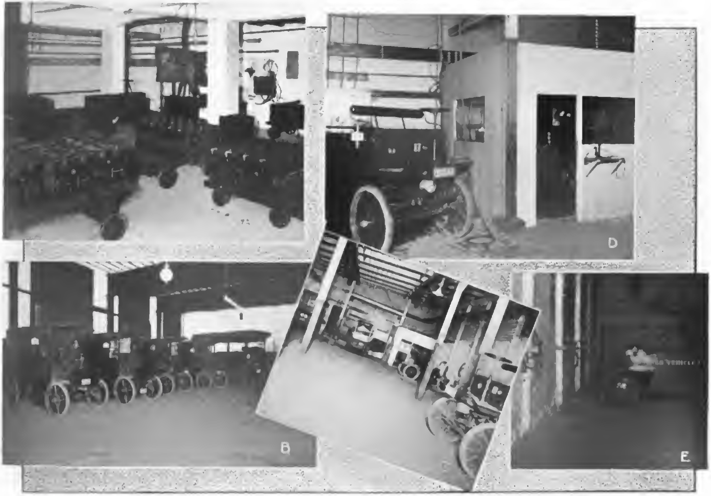
Account
Total Time, Hours Minutes
Rate per Hour Cost
Repairs made by

Blank Forms Used in Edison Garage, Boston. At Left, Tire Report Sheet; Center, Driver's Record Card, Tire Record Tag, and Right, Machine Repair Car thoroughly familiar with the vehicle and he can fit up quarters on premises of his own, but in most instances the trucks are regular boarders, the owner preferring the expert service obtainable in the Edison garage rather than attempting to establish a place of his own.

How the Garage Is Conducted

The garage is conducted under the auspices of the Electric Vehicle Association of America and is in direct charge of a committee of that organization. Besides regular garaging it provides a boosting station for electrics regularly kept elsewhere. The building is one story high and the interior is fitted up entirely from a utilitarian standpoint. There is a commodious entrance from a private way leading off Atlantic avenue, the entrance being large enough to take in the largest truck loaded. The floor space is 100 feet deep and 50 feet wide and the roof clearance is 30 feet. The floor is of smooth concrete. Near the entrance is the washstand, repair shop and battery space. The office is also close to the entrance and is fitted up comfortably for the convenience of the operators, and provision is made for keeping of all operating and maintenance data in detail so that the exact costs of all descriptions can be supplied the customer on short notice.

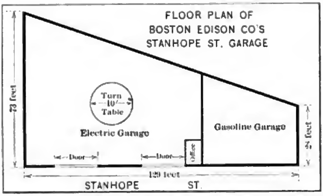
The supply of current is from the Edison company's direct-current three-wire mains and is conducted to two General Electric charging panels located in the office. Each has mounted upon it six charging switches, instruments and G. E. charging rheostats, from which the current is carried to Anderson charging receptacles located conveniently about the charging area of the garage. Plugs with sufficient lengths of cable are provided to accommodate vehicles in any part of the building. There are facilities for charging sparking batteries, a work bench and full equipment of modern hand tools for light repair work. At the opposite end of the garage from the entrance is a gallery which contains the stock room, where all sorts of supplies and spare parts are carried constantly. There are also quarters for the drivers supplied with lockers, tables, chairs and the like. The garage is illuminated brilliantly with Mazda lamps equipped with holophane reflectors.



Interior Views of the Two Buildings, A B and D at Stanhope Street, C and E at Atlantic Avenue. A Shows the Battery Room, B the General Interior, and D the Charging Panel. C Is the Downtown Interior and E a Corner Showing Vehicle on Charge

What the Monthly Charges Include

The plan on which the garage is conducted is to offer service at a flat monthly rate, the service including electric charging irrespective of mileage, washing, flushing, battery testing, inspection, polishing, expert advice, adjustments and minor repairs. The garage also is prepared to undertake battery overhauling, washing, lead burning, renewal of electric lamps, extraordinary repairs and replacements and tire work at the regular commercial rates. There are spare vehicles on hand for towing

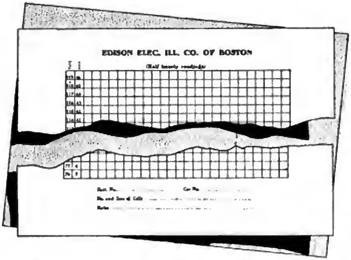


Floor Plan of the Stanhope Street Building Showing Triangular Shape and General Arrangement

cars that may become disabled through accident; they are supplied at reasonable rates and are rented when machines are laid up for repairs or overhauling. The Edison company has not attempted to draw trade away from other garages. Its object is educational primarily and also to provide a first-class garage for the convenience of owners of electric trucks. This garage has helped the trade wonderfully in the short time that it has been in operation, for it has solved the problem of the electric vehicle salesman in recommending a garage where first-class service is guaranteed, and the question the purchaser formerly was wont to ask now presents no difficulty in answering. With the enlargement the Edison garage will be able to accommodate the growth in electric commercial vehicles for some time to come.

The Edison company's private garage, in which it stores and cares for the large number of vehicles it has in its own service, both cars and trucks, is on Stanhope street just off Columbus avenue and a few steps from Copley square. The building was formerly a power plant, but has not been used for that purpose in a long time. It formerly was rented by the company to an automobile concern, but three years ago was occupied by the company.

The Edison company long ago declared its intention of abandoning horses for motor vehicles and for several years has been carrying out that policy. About a year or so ago the company declared for electric vehicles in all its work, and insofar as the development of the electric permits the company is using it in preference to gasoline cars. On some of its long-distance work, however, it still finds the gasoline car necessary. Of the 79 motor vehicles that it owns, however, 38 are electrics. The electric cars are classified roughly as follows: Five runabouts, 15 lamp wagons of 700-pounds capacity, eight delivery wagons of 1000-pounds capacity, one line installation truck of 1500-pounds capacity, two delivery wagons of one-ton capacity, one pump wagon of one-ton capacity, one line wagon of 1.5-tons capacity, one cable truck of two-tons capacity, one cable truck of 3.5-tons capacity, one ash dump wagon of four-tons capacity and two cable testing trucks of five and six-tons capacity.


EDISON ELEC. ILL. CO. OF BOSTON

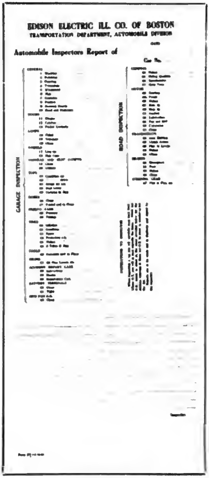
(Half hourly readings)

Charging Record Sheet for Storage Batteries on Which Are Noted All Details of Each Charge

Where the Electric Vehicles Are Used

All but about a score of the company's motor equipment is kept in the Stanhope street garage. The others are kept in garages in suburban towns for use in the outlying districts. At the Stanhope street garage there are 57 vehicles in all, of which 26 are electrics. The garage is divided into two parts, the larger for the electrics and the smaller for the gasoline cars, which are mostly on the runabout or touring car order and are used by officers and department heads in inspection work and the like. The Edison company uses motor vehicles principally for the delivery of lamps, meters, etc., to customers, for line work including cable pulling, the large trucks being equipped with electric winches, and for supervision. The transportation department, of which C. A. White is the head, has complete charge of the cars and the garage. This department buys the vehicles upon the authorization of the different departments and maintains them, supplying all the care and the chauffeur if desired. Each department is charged the original cost and the maintenance of its motor vehicles.

The Stanhope street garage has a main floor where the 57 vehicles are housed, a second floor where the repair shop is located and a basement which contains the battery room with complete facilities for charging, cleaning, repairing and the like. The company always carries spare batteries in case of trouble, or in in-


EDISON ELECTRIC ILL. CO. OF BOSTON

TRANSPORTATION DEPARTMENT, AUTOMOBILE DIVISION

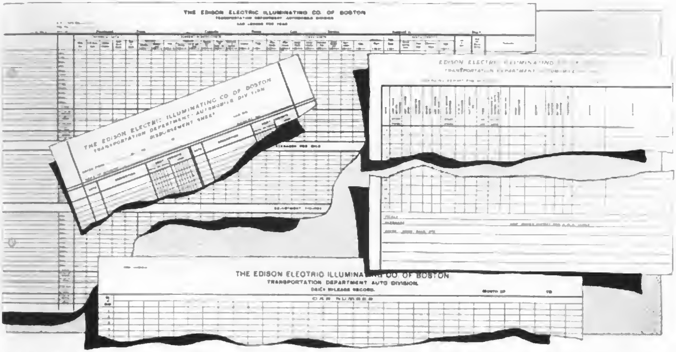
Automobile Inspectors Report of

Car No.

GARAGE INSPECTION

ROAD INSPECTION

Inspection Blank Form on Which Are Noted All Garage and Road Inspection Notes



THE EDISON ELECTRIC ILLUMINATING CO. OF BOSTON

THE EDISON ELECTRIC ILLUMINATING CO. OF BOSTON
TRANSPORTATION DEPARTMENT · AUTOMOBILE DIVISION
DISBURSEMENT SHEET

THE EDISON ELECTRIC ILLUMINATING CO. OF BOSTON
TRANSPORTATION DEPARTMENT AUTO DIVISION
DAILY MILEAGE RECORD
CAR NUMBER

More Blank Forms, Notably at Back, Car Ledger on Which All Other Items Are Posted; at Left, Disbursement Sheet; at Right, Monthly Charging Report for Battery Action; Below, Daily Mileage Record Sheet

stances of a vehicle being needed for 24-hour service. The machines that are kept in suburban garages are inspected weekly and small repairs are made where the vehicles are kept. For overhauling or large repairs all vehicles must come to the Stanhope street garage. There are two main entrances for vehicles in the Stanhope street garage, and in the main floor a large turntable. For each electric vehicle there is a separate charging post. The gasoline cars are kept in a section separated from that of the electric cars by a fireproof partition.

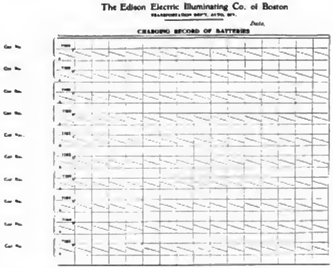
The System of Accounting and Blank Forms

The company has an extensive system for keeping track of the vehicles and has devised a set of tags, cards and record sheets for daily, weekly, monthly and annual reports on each machine. Some of these are illustrated herewith. There is a battery tag upon which data concerning the installation, taking out, washing, charging and mileage is kept; a card upon which is recorded the weekly in and out record of a truck; a repair time card; a workman's time card; a daily odometer reading slip; a tire record tag; a sheet for the inspector's report; a battery charging report; a sheet for battery readings during charging; a catalog card giving the complete record of every vehicle; a battery charging report; a complete tire record for each car; a tire adjustment blank; a disbursement sheet; the daily mileage record; the yearly car ledger and the monthly charging report. All these documents go to the headquarters of the transportation department, which thereby has a complete record of the performance of every car in service.

The driver checks in and out of the garage and makes report of any troubles, which are attended to by the working force of the garage, which includes a superintendent, two clerks, stockkeeper, a day and night crew, each in charge of a sub-foreman and together made up of 13 repairmen and helpers, a battery man, three washers, three polishers and a floor man. If a car is assigned to an officer of the company he is responsible for it and has to qualify as a driver to the satisfaction of the garage superintendent, who also has charge of the chauffeurs. The vehicles are generally in service from 8 in the morning until 5 in the afternoon, but the garage is always open, because vehicles are called for at all times of night for emergency work. There are never less than two men on duty in the garage.

Complete Periodic Inspection Important

A feature of the garage management is the periodical inspection of the vehicles. They are given a general inspection every night, but to one man is detailed the work of making a thorough inspection of every car periodically. He selects the car he is to inspect, so that the garage men and drivers never know when their car is to be looked over. In his inspection he reports on every

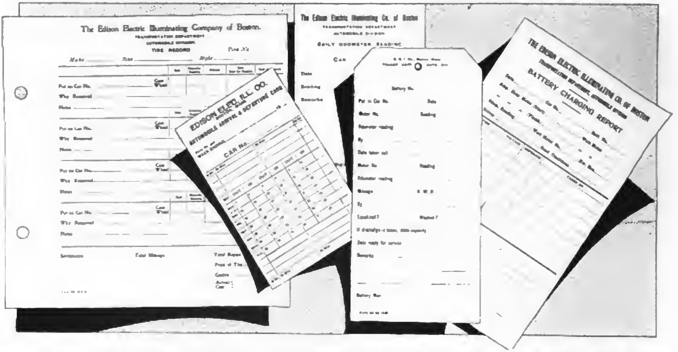


The Edison Electric Illuminating Co. of Boston

Date,

CHARGING RECORD OF BATTERIES

Another Battery Charging Blank Used in Keeping Track of the Performances


The Edison Electric Illuminating Company of Boston.
TIRE RECORD
Put on Car No.
Why Removed
Notes
The Edison Electric Illuminating Co. of Boston
DAILY ODOMETER READING
Car
EDISON ELEC. ILL. CO.
CAR NO.
Battery No.
THE EDISON ELECTRIC ILLUMINATING CO. OF BOSTON
BATTERY CHARGING REPORT

Additional Forms Used in Boston Edison Garage; at Left, Tire Record; at Back, Daily Odometer Reading Record; at Right, Summary Sheet for Battery Charging; Center, Arrival and Departure Tag and Car Performance Report Tag

item, including washing and polishing, the condition of the trimmings, paint and varnish, mats and windshield, the doors, lamps, wheels, tonneau and seat compartments, tops, robes, gas tank, tires, tools, oiling, battery, brakes, steering gear, etc. The driver whose car is not in first-class shape, not only as to mechanism but as to cleanliness and orderliness, is called to account, as are also the garagemen responsible.

The Stanhope street garage is considered a model in its management and supplies a large quantity of valuable information in the care and maintenance of electric vehicles that is useful to other keepers of electric garages and to the trade. It has been outgrown, however, and within another year the company expects to occupy the new garage that it is to erect on Massachusetts avenue. This new structure will be in two divisions, one for electric vehicles with a capacity of 100, all on one floor, and a three-story gasoline car garage. The electric garage will be 110 by 26 feet in dimensions and the gasoline car garage 110 by 80 feet in dimensions. The garage will have its own power plant and across a private street will be the company's stock department so that the trucks and delivery wagons can be loaded at night as conveniently as in the day.

Electrics Adopted by Wilmington Firm

WILMINGTON, DEL., Mar. 11—After a few weeks' use of two new electric trucks officials of the Wilson Line of steamboats are so thoroughly convinced of their superior value for delivery service that the company will put three more of the same type in service in the course of a few days. The trucks were purchased from the Commercial Truck Company, Philadelphia. They have a standard rating of two tons with a 50 per cent. overload allowance. After a careful study of the worth of electric vehicles as shown by firms which had used them in similar lines of delivery work, the Wilson people decided to make all city deliveries with five electric trucks, and retain only two gasoline cars for suburban service. The company operates a steamboat line between Wilmington and Philadelphia.

An official of the line stated today that as a result of his study and of his firm's experience with electrics, he was convinced that not only do the electric commercial vehicles excel in the quality of delivery service, but that they were more economical than many others. Particularly did he believe this to be true of the labor cost. It has been their experience he said, that after two days' demonstration, their ordinary teamsters could manipulate an electric truck competently, while their gasoline cars required a high-priced driver always. The Wilson line has provided for the charging of its trucks by instaling its own charging station.

In the new garage, erected on the site of the stables that were burned some months ago, there is a complete up-to-date battery charging plant. An electric generator receives a current of 2200 volts and that current is transformed to a 110-volt direct current for six charging panels. In the garage each truck is assigned to a separate stall and is recharged at night after the day's deliveries have been made. The operating cost of electric trucks, even with a liberal allowance for interest on the charging plant, has been proven less than gasoline.

The same official was convinced that there could be no question of the comparative life of electric and gasoline trucks for quick, constant deliveries, such as patrons demanded. From what he had been able to learn of the life of electrics in the service of other companies, and the life of their own gasoline cars, he placed the life of the electrics at four or five times that of other cars.

Type of Chase Light Delivery Car Bought by Stern Brothers

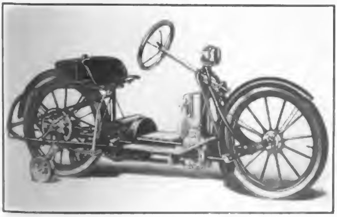
LARGE SALE TO NEW YORK DEPT. STORE

In the illustration herewith is shown one of a number of vehicles recently sold to a large Metropolitan Department House by the Chase Motor Truck Company, Syracuse, N. Y. This firm, Stern Brothers, is a very conservative one and only adopted the motor trucks for its transportation service when their economy and reliability had been proven. Almost before the final order had been accepted came a re-order.

NEW SMALL CARRIER WITH TWO WHEELS

In the handling of the product of smaller firms the motorcycle tricar has been found advantageous and very low in cost of operation. But comfort of the driver was not a part of the design. This fault has been avoided in a new and very novel machine just placed on the market by the Militaire Company with headquarters in Cleveland.

The new machine,, called the Militaire, has an underslung frame, made possible by a simple arc-shaped front axle. By this method of suspension the center of gravity is brought low, thereby increasing the stability of the machine, as well as its safety and comfort. The elimination of the upper cross-bar characteristic of the diamond frame also permits of a comfortable bucket seat with back, which is suspended on a cantilever mechanism and secures easy riding qualities never before approached in a machine of this type. This is also the first two-wheel motor vehicle to have a steering wheel and column with spark and gas control. Another novel feature is the fact that the machine is friction driven, eliminating all gears, while permitting of a wide range of speed changes, for example: 30 to one on low, three to one on high, and 10 to one on reverse, the reverse being a distinctive feature of this machine.



Side View of New Militaire Package Goods Carrier

NEW EXPRESS COMPANY WILL USE TRUCKS

Tefft & Company, New York City, recently offered for sale stock in the Atlantic Express Company which carried a seven per cent. cumulative dividend. This is a new company which has been formed to conduct a general express and transfer business in New York, Boston and intermediate points of New England. It is proposed to operate a number of large motor trucks on a regular schedule between the bigger cities with smaller vehicles for local delivery service in them. In the formation of this company it was said that 100,000,000 packages of express matter under 50 pounds in weight are handled yearly in New York City producing a revenue of more than $17,000,000. The new company starts with John J. McDonald as president, William Loeb, Jr., and William McAdoo, directors.

Sprinkling Wagon on Autocar Chassis in Service at Pensacola

INNOVATION IN LIGHT CAR BODIES

Pensacola, Fla., March 23.—The sprinkling wagon which was built especially for this city by the Autocar company on its standard 3000-pound chassis, has arrived and been placed in service. The climate here is so warm that this wagon is a necessity during the entire year. The great expense of doing this work with horses, together with the extreme wetting and number of puddles left by the slow-moving vehicles, decided the municipal authorities to look into motors with the result, the purchase of this car. The capacity of the cylindrical steel tank is 300 gallons.

WILL SELL MOTOR TRUCK SERVICE

A large Cincinnati concern, the Fisher Auto & Service Company, proposes to rent commercial vehicle service to business houses on the basis of nine hours a day. The rates are in keeping with the convenience, speed and stability of the machine for horse-drawn vehicles.

Commercial Car Questions Discussed

Methods of Marking and Making Gaskets

EDITOR COMMERCIAL VEHICLE:

(15)—Will you please give me an idea of the way to go about cutting gaskets for various truck parts, from heavy paper and also from thicker materials such as asbestos sheets, leather and the like? I have tried doing this with a knife, scissors and in other ways but always seemed to spoil the gasket just as I had it finished.

Jersey City. D. W. DOLAN.

There are two methods of doing this which are in general use, one consisting of marking out in a convenient manner and then cutting with knife, scissors or other sharp tool. As the correspondent has brought out above, this is not always a successful way. The other method consists of marking and cutting the gasket at one operation, but this can be employed only when the surfaces to be covered present a sharp or fairly sharp edge.

Both methods are illustrated, that at Fig. 1 showing a modification of the usual marking way. In this a piece of charcoal or very thick black crayon is used, but instead of running it around the holes and edges of the piece to be fitted with a gasket, it is scraped across the edge so as to leave a slight ridge or pile of the crayon or black material above the same. Then, when the paper is pressed down upon it, a very distinct impression is produced for the material takes up the small pile of black around the hole or along the edge. This may and often does result in a double line being made on the paper, one for the inside of the hole as indicated by the inner circle and the other for the outside of the ridge of black, as shown by the outer circle. The latter is the best one to follow, as it allows of considerable inaccuracy in cutting and a slight movement of the bolt when entering or removing, without breaking the gasket.

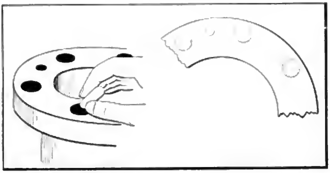


Fig. 1—Method of Marking Gaskets so as to Insure Accuracy in Cutting Out

The second way is shown in Fig. 2 and consists of marking out and cutting at one and the same time. Take a cylinder gasket for instance, as the man is shown cutting. For this the method is ideal, as the cylinder base and edges of the bolt holes will all have sharp edges. The sheet of paper of the approximate size is laid on the part, firmly fixed in a vise and with a light hammer, the inner edge (in this case) gone around. Light blows should be used, until a full circle has been marked out, when a heavier blow can follow around. These will cut through the material since they will force it down onto the sharp edge. Having the inside cut, it can be dropped over the projecting portion of the cylinder, and the exterior cut off in the same manner. Next the holes may be cut with the hammer if they are large or with a prick punch if small. In any case, as soon as one has been cut it is well to put a punch through it so as to prevent the gasket from turning.

In this work, the only care necessary is in striking a blow so that the flat portion of the hammer meets the edge in such a way as to have a cutting force, but not with sufficient force to peen over that edge. Many machinists and mechanics do this work entirely with the ball peen end for fear of damaging the part with the flat part. The method is the same, however.

Warping of Exhaust Valves Due to Late Ignition

Editor COMMERCIAL VEHICLE:

(16)—The engine in my truck causes a great deal of trouble by becoming overheated and recently the exhaust valves have become pitted and warped so that they leak. The exhaust pipes also are warped near their connections with the cylinders. Can you advise me what will prevent this trouble?

Buffalo. H. J. MORSE.

Evidently the trouble is in the ignition. From the effects described the ignition is too late. The timer should be advanced further when running at high speed. It would be a good plan to see that the timer actually advances with the lever, as the connection may be defective.

Number of Different-Sized Trucks in Use

Editor COMMERCIAL VEHICLE:

(17)—What percentage of the commercial vehicles now in use are of the five-ton size, what proportion heavier than five tons, and what number of two tons capacity?

Tonawanda, N. Y. H. R. AVERILL.

All these figures will be found elsewhere in this issue, in the statistics of the cars now in use. There it will be noted that the heaviest trucks, above five tons, consist of 2.2 per cent. of the total or 670. Those carrying five tons amount to 4.8 per cent. and 1,440, while the two-ton class has a total of 5,130 or 17.1 per cent.

Laying Up Storage Batteries

Editor COMMERCIAL VEHICLE:

(18)—What is the best way to put storage batteries away, when not in use, charged or not charged?

Pittsburgh. JOHN R. ALLEN.

Experts differ as to the advisability of the two methods. It is held by some that the best way is to take the plates out of the acid, clean them in cold water and then put away, out of the usual battery case and in a dry condition. Others claim that the best method is to charge them and add fresh electrolyte so that the battery is ready for use when taken out. They say in defense of this method that it keeps the plates in an actual working condition at all times, and that so long as no current is drawn from them, during the time they are standing, this is better for them.

The following is an excellent description of the routine to be followed when the putting away dry method is followed, and will give first class results, regardless of whether it be the better method: First look over or test each cell separately with a voltmeter, and if any cell is short-circuited, clean it out and put it in shape. Then give the battery a complete charge.

After charging, the elements are removed from the cell, the positive plates being separated from the negative. Both sets are placed in water for an hour or so, in order to remove any electrolyte, and they are then allowed to drain and dry. When they are dry the positive plates are in a condition to be put away. If the negatives show any tendency to heat they should again be rinsed in water. They should then be replaced in the electrolyte, being completely immersed and allowed to soak for three or four hours, after which they can be rinsed and put away. Rubber separators should be washed in water and then stored away, while if wood separators are used it is best to throw them away, because after they have been exposed to the air they are usually very weak.

Engine Power Lost in Mufflers

Editor Commercial Vehicle:

(19)—There has been a great deal of discussion here this season about automobiles being run with the mufflers open. I have several trucks and most of my drivers insist upon running with the muffler open especially on suburban runs. What is the loss of power if any sustained when running with the muffler closed?

Erie, Pa. Harry Newton.

Recent tests show that there is practically no loss of power when running at a fair rate of speed with the muffler closed and when running at a high rate of speed, the power is greater with muffler closed. The following are the results of the tests conducted at Rutherford, N. J., on March 19:

Revolutions a minute.	Horsepower cut-out open.	Horsepower Cut-out closed.
300	13.0	13.5
500	22.5	22.5
700	31.25	32.0
900	38.5	38.5
1000	41.5	43.0

A 30-horsepower, four-cylinder stock Packard motor with a standard muffler was used in these experiments.

Proportioning Inlet and Exhaust Sizes

Editor Commercial Vehicle:

(20)—Will you kindly advise me in what manner the exhaust and inlet pipe sizes of the ordinary motor truck engine are proportioned? How is the outside diameter determined?

Boston. R. L. McKee.

The areas of such pipes are figured from the allowable speed of the motor and the permissible speed of the gases. For the latter, 10,000 feet a minute, lineal travel is considered as high as it is advisable to figure on for the exhaust, while the carburetted gas should not travel much above 6,000 feet a minute. The diameter of the piston and its travel determine the cubical contents. Multiplying this by the number of exhaust and suction strokes a minute, respectively, gives the total inflow a minute for the two manifolds. The number of strokes is determined, of course, by the revolutions, and is one-half the number of turns a minute in each case.

Having now, the total amount of gas which must flow in during a single minute, divide this by the permissible speed for the two kinds of gas, and the results will be the desired areas. Reducing these to circles or squares according to the desired shape of the pipes will give the answer required. To find the outside sizes, add twice the minimum casting thickness. For aluminum, this may be as little as .125-inch for each wall, but for cast iron .156 to .187-inch is about as thin as can be made to flow with success. If the material is aluminum then add .25-inch and if cast iron not less than .31-inch.

Starting Engine When Crank Is Broken

Editor Commercial Vehicle:

(21)—Will you kindly tell me the best way to start an engine when the crank has been lost or broken? I lost the crank on my truck recently but fortunately had stopped on a hill and was able to start again by coasting.

Duluth, Minn. M. W. Roberts.

In a case of this kind, if the motor does not start on the spark after having been primed by pouring a small quantity of gasoline into the pet cocks at the tops of the cylinders and the flywheel is accessible, the latter may be used. Care should be taken, however, to push it instead of pulling it. Grasp the wheel by the smooth rim to avoid all danger of injury to the hands.

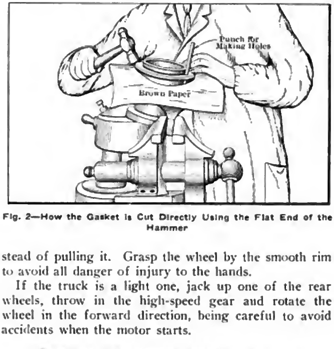


Fig. 2—How the Gasket Is Cut Directly Using the Flat End of the Hammer

If the truck is a light one, jack up one of the rear wheels, throw in the high-speed gear and rotate the wheel in the forward direction, being careful to avoid accidents when the motor starts.

Repairing Transmission Chains on the Road

Editor Commercial Vehicle:

(22)—One of the transmission chains on our truck was broken on the road the other day and we had to be towed into town, thus losing much valuable time. I should like very much to know how to repair one of these chains on the road.

St. Louis. R. C. Morton.

Repairing a transmission chain on the road is by no means an easy task unless extra links and pins are available. If this is not the case a short piece of heavy wire or a nail may be used for a pin, care being taken not to rivet it down so that it grips or binds the links together. In replacing a link, wire may be wound over the pins at the broken point, keeping them at the proper distance apart, corresponding with the pitch of the chain, or the latter will not run on the sprockets. This method is advisable only when a quick repair is necessary.

MILESTONES *in the* MUNICIPAL MOTOR'S PROGRESS

VERY rapid progress is being made, the country over, in the adoption of motor-driven fire, police and other municipal apparatus. The bold strides made by a few of the larger cities have shown a fair profit in addition to the undenied greater speed, mobility and other advantages of municipal vehicles. This has led to the adoption of motor-driven cars by many of the smaller and medium sized cities.

A study of a list of these will convince anyone that this tendency is not sectional nor restricted in any manner. Believing that brief mention of the various opportunities for sales throughout the land and of the most recent purchases represents the milestones of progress of the municipal motor-driven wagon, the COMMERCIAL VEHICLE presents herewith the first installment of these.

In the case of those opportunities not yet closed, it is hoped that the manufacturers of such equipment will be able to secure some business which they could not get otherwise. In the instance of cities or towns still discussing the advisability of making a change to motors, it is hoped that the makers will hasten to convince the interested parties for the good of the whole industry with incidentally a fat order in prospect. In reviewing the instances presented below, it will be noted that all kinds of sales opportunities are presented, varying from a vehicle at $1,500 to a group at $70,000.

Marblehead, Mass., is considering the purchase of a combination chemical and hose wagon.

S. Framingham, Mass., considered the purchase of a combination chemical and hose wagon at its town meeting early in March. The proposition, carrying an appropriation of $6,000, will be submitted to the voters at an early date.

The committee on finance of Cambridge, Mass., has recommended to the city council the purchase of municipal apparatus as follows: One piece of motor apparatus at $5,900; one piece of motor apparatus at $3,500, and one motor ambulance at $4,500.

On March second the city council of Beverly, Mass., appropriated $6,000 for a motor chemical and hose.

The proposition to purchase a chemical and hose wagon for the city of Portsmouth, N. H., for $5,000 was passed without debate and the money appropriated early in March.

Columbus, O., advertised for bids on a two-passenger runabout of at least 30 horsepower for the fire department and two similar cars of 16 horsepower for the division of buildings.

The Livingston Hose Company, Dobbs Ferry, N. Y., wanted an appropriation of $6,000 for a combination motor-driven truck, and at a recent town meeting this was voted.

Nashville, Tenn., will ask for bids shortly on a combination fire engine, the chief of the department having recommended its purchase.

The fire committee of the city council, Macon, Ga., met recently to consider the merits of motor apparatus. It is planned to buy two more engines and a hook and ladder.

Findlay, O., is considering the purchase of a motor-driven chemical engine or the alternative of buying a chassis and applying chemical tanks from present horse-drawn apparatus.

New Rochelle, N. Y., advertised for bids (closing March 12) for a 700-gallon combination pumping engine and hose wagon.

Montpelier, N. H., is discussing the purchase of motor-driven fire apparatus.

The fire engine committee of N. Andover, Mass., reported recently and recommended strongly the purchase of a combination motor wagon to carry 1000 feet of hose, a 30-gallon tank and a 30-foot ladder at a cost not to exceed $6,000.

Dubuque, Ia., has advertised for bids on motor apparatus, but the fire committee has been unable to agree upon the preferred bidder. There is a possibility that the bids will be thrown out and readvertised.

At a recent meeting of the city council, Freeport, Ill., the purchase of a motor fire truck was discussed. Bonds for $28,000 to cover this and a new station in E. Freeport was asked for.

Henry Campbell, purchasing agent, Milwaukee, is receiving informal bids for two one-ton motor trucks for the use of the municipal waterworks department. A selection was to be made about March 20. No official call for bids will be made.

The fire board of East Orange, N. J., has asked the finance committee of the common council of that city to buy an engine and also a motor gig for the fire chief. No sum was fixed by the board.

To avert the delay which would be caused by a lawsuit over the contract for purchasing two chemical engines from the Seagrave Company, Mayor Beard of Sacramento, Cal., recently vetoed the award and the trustees sustained the veto.

An automobile hose cart and fire engine, costing $8,500, will be purchased for Buffalo, if the report of the Aldermanic fire committee, which was made to the board on March eighth should be adopted.

Sealed proposals were received up to March 28 for furnishing the Chicago Fire Department with 10 more motor-driven combination chemical and hose wagons.

The council of Youngstown, O., has passed an ordinance to issue bonds in the sum of $70,000 for motorizing all the apparatus in the fire department.

The Council of Canton, O., turned down the recommendation of the finance committee for a $70,000 bond issue for new motor fire apparatus equipment after most vigorous debate.

Fire Chief Lauer, Columbus, O., is going over the horses in the fire department with a view to culling out the older and less efficient ones, which give up their places to the new motor vehicles for which $50,000 has been appropriated by council.

At a town meeting held early in March at Attleboro, Mass., $5,500 was appropriated for a combination ladder truck to be used in the S. Attleboro branch, probably by Hose Company 4. This will be purchased by the department heads, not by competitive bids. The town owns a Knox machine, installed last August.

Experience of a year with a motor-driven engine has led to a decision on the part of the Board of Fire Commissioners, of Newark, N. J., to buy no more horse-drawn apparatus. Henceforth the motor wagon alone will be considered. The ultimatum has not reached the stage of official action as yet, but the board is a unit on it. A new motor aerial truck is to be bought and will replace a horse-drawn vehicle, while the chief wants a high-pressure gasoline wagon in addition. Double company quarters are building in the southwestern part of the city and in these a motor-driven engine and hook and ladder will be housed.

The purchase of ground has been made for central fire station in Old Levee, La., the price for same being $9,500.

The Fire Commissioners of Buffalo recently voted to buy motor fire apparatus and station it in the heart of the retail and manufacturing district.

Another automobile hook and ladder truck is being considered for the New Albany, Ky., fire department. Members of the Board of Public Safety and the City Council held a meeting recently to decide upon this.

Bids for the purchase of a motor-driven truck recently opened in Fort Smith, Ark. Two or three manufacturers submitted proposals, prices ranging from $5,000 to $10,000.

Sealed proposals were received at the office of the Director of Public Service, Cleveland, O., for furnishing two light delivery automobiles.

The Safety Department of Findlay, O., has been considering for some time the installation of chemical cylinder on motor trucks.

Chief L. G. Rodgers, of the Olean, N. Y., Fire Department ,is strongly in favor of the city's purchasing another automobile truck and has submitted his views to the Common Council.

Chief Avery, of the Worcester, Mass., Fire Department, is so well satisfied with the two pieces of motor-drawn apparatus which have been in service for almost 20 months, that he wants the entire department transformed to motors. He states that if more horse apparatus is added a new house will have to be built at a cost of $25,000. By adding several motor-driven pieces, which can be housed in the present buildings, this expense can be avoided and the money saved.

The Board of Councilmen of Buffalo ignored the complaint of Arthur W. Meyer, representing the Knox company that the fire board had discriminated against him in the matter of recommending the purchase of a combination motor fire engine and hose wagon, and concurred in the action of the aldermen, recommending that the contract for the apparatus be awarded to the American LaFrance Company.

The Fire Committee of the city council and board of fire commissioners, Jackson, Miss., held a special meeting recently for the purpose of placing an order for a motor chemical wagon for the fire department.

The council of Norwalk, O., at a recent meeting, passed an ordinance authorizing the construction of a motor fire station and purchasing equipment for the same and also authorized the issuance of bonds in the sum of $10,000, the proceeds from which are to be used for the station and equipment.

Plans have been approved by Battalion Chief L. G. Holden for a fire station to be erected on the Foster road in the Mount Scott district, Portland, Ore. The cost is estimated at $26,000. Probably a combination motor chemical engine will be placed in this building.

Jacksonville, Fla., is preparing for the installation of new automobile fire fighting apparatus.

Wilmington has added two Ford runabouts to its municipal car equipment. One is for the use of the Water Department patrolmen and the other is for the use of Superintendent Edward R. Mack, of the Department of Parks.

The volunteer fire department of Sawtelle, Cal., is raising a fund to purchase a motor-driven piece of apparatus.

Nevada City, Nev., plans the purchase of a combination chemical and hose wagon this spring.

Announcement was made in Little Rock, Ark., recently that arrangements have been completed by the city officials for the financing of an improvement policy for new fire equipment. A meeting of the board of public affairs was called to authorize the advertising for bids on four new pieces of fire apparatus.

Sealed bids were received at the city hall until March 21 for the furnishing of one complete combination chemical and pumping motor fire engine for Lakewood, O.

The proposed $70,000 bond issue for re-equipping the fire department at Canton, O., became a reality when council, by a vote of nine to one, adopted the finance committee's report in favor of the issue.

The Wilkinsburg, Pa., Fire Department will receive bids until April 10 for one combination chemical and hose automobile fire truck.

The city council of Meadville, Pa., has passed a resolution calling for the purchase of a motor-driven fire engine and hose wagon. The wagon will be of not less than 60 horsepower and will cost from $6,000 to $7,000.

Councilman Reed, of Hollywood, Cal., recently instructed the supply committee to purchase a motor-driven fire engine.

Proposals for supplying 31 pieces of motor apparatus to be used in suburban districts of New York City were advertised on March 22 by Fire Commissioner Johnson and bids will be opened on April 1. The pieces are as follows: Scout type of combination chemical and hose wagon with two 35-gallon tanks and 32 or more horsepower, 300 feet of one-inch hose and steel bodies to carry 1200 feet of 2.5 inch fire hose and full complement of men—26 of these, delivery in 240 days; three high pressure hose wagons of 45 horsepower or more with steel bodies to carry 2100 feet of three-inch hose and full complement of men and equipment, delivery in 120 days; two hose wagons with chemical attachments, 40 horsepower or more with steel bodies to carry 1500 feet of 2.5-inch hose and full complement of men and equipment, delivery in 120 days; all must have four- or six-cylinder engines of the four cycle type, water or air cooled, have a maximum speed of 30 miles an hour, be equipped with solid rubber tires guaranteed for 7500 miles and be guaranteed for three years under a bond of 50 per cent. of the purchase price.

Mechanical Notes for Truck Drivers

Removing and Replacing Piston Rings

FOR the amateur or the workman who has never attacked the problem previously, the removal and replacement of a set of piston rings is a most ticklish and difficult job. In the execution of this almost anyone would welcome assistance, for carrying it out alone is even worse than doing it with help. There are several things which must be considered in this; the rings are fitted tightly and have much natural spring which opposes removal or any other operation which necessitates enlarging their diameter, they are made of a very brittle material which will break upon the slightest provocation, replacement of broken rings is expensive, entails a long wait and much additional work. For these and other reasons the problem should be approached slowly and with the exercise of much care.

There are tools available for spreading the rings, but so few of these are satisfactory that they are not used widely. One is shown at the left of the illustration herewith, this consisting simply of a pair of bent strips of metal of a flattened V shape held together at the points of the Vs by a ring. Obviously, they work just the opposite of a pair of scissors in that pressing the longer ends together opens or spreads apart the shorter extremities. With a diagonally cut ring, this can not be used to advantage, but with the stepped form it can.

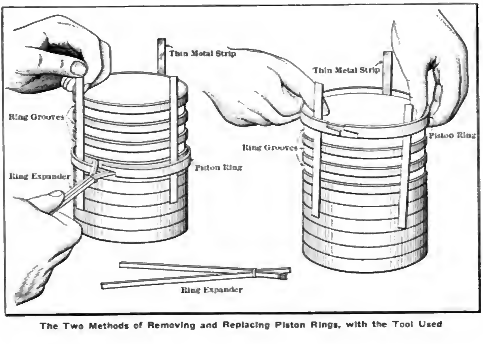
In the latter case three or four thin flat strips of steel, like corset steels or old worn out hacksaw blades, are prepared of a length equal to the distance from the bottom of the lowest ring to one inch above the top of the piston. When the ring has been expanded by means of the tool just mentioned, a pair of these steels are slipped under it on each side of the cut, in order to keep it from dropping back into the groove. By further spreading or the use of other thin pointed tool, the back is drawn out and the third or third and fourth strips inserted.

Since the ring is held above the surface of the piston by the strips, it may be drawn toward the top by the hands without danger of dropping into any of the grooves. In this connection, it is best to remove the lowest ring first and replace it last, since then each ring withdrawn or replaced works over the tops of the other rings in place which is more easily managed than working over the grooves.

When the expander is not used, one end of the ring must be held in position while the other is pried up with some thin pointed screwdriver or other sharp pointed tool. This done, a steel can be placed below it and the tool moved around to the back of the former. By working around the ring from the end which is out to that which is still in the groove, the other strips may be inserted without any trouble. The ring then can be withdrawn just as described in the first case.

In all of this work, the delicate cast iron ring must be handled very gingerly, especially when prying or expanding it, proceeding very slowly and gradually. In replacing the parts, the method is very similar but reversed. The strips are laid around the piston at equidistant points and the ring set over them. Bringing the ring down to the top of the piston, it must be spread so the strips lay flat against the sides of the grooves member. Then, the first ring is slid down until it drops into the top groove. The process is repeated with the second one, using care to have the strips so laid on the piston as to end just above the groove into which it is desired to fit the ring.

If the rings should be so weak that they will not expand as much as is desired or necessary, the bottom of each groove may be wound before replacement with a thin layer of string or wicking. Placing the ring on top of this will add several thousandths of an inch to the diameter of the rings so they will fit tightly, although the practice is deprecated because of the danger of the wicking or string burning from contact with the heated piston and rings. A better plan is to buy new rings.



The Two Methods of Removing and Replacing Piston Rings, with the Tool Used

Starting on a Cold Morning

Drivers of commercial cars will not need to be told that on occasions in the morning after a night's rest it is a difficult matter to start the engine, especially if the morning be a cold one, and the result of trouble of this nature and the way it was cured may be of interest to others experiencing the same drawback. After a car had been standing all night the driver on going to start the engine next morning, which was rather a cold one, found that unless he had about five or 10 minutes at the starting handle, cranking over the engine, it would not start, but that later on when the engine was hot it would start easily enough. He looked round the car to see if he could remedy the defect, examining the plugs and contacts; these, however, were found to be in good condition. Then he tried the effect of shutting off all the air that was possible, and also advancing the spark a little and he then found that the engine started quite satisfactorily even when cold. By getting a rich mixture to start with in this way there is no trouble experienced in starting the engine, and it is hoped that this hint may be of service in assisting other drivers in avoiding long and arduous labor cranking over a sluggish engine.

Testing Weak Valve Springs

A simple rigging for testing out valve springs or others which are suspected of being, or are known to be weak, is made from a forged plate, a flat strip of steel, two special bolts, some nuts and two old scales as follows: Have a long bolt of good size, say .625 or .75-inch diameter, welded to a flat bar of iron wider than the springs to be tested and thick enough to be quite stiff. In the bar drill two holes at equal distances on each side of the central bolt. In a lathe turn up a pair of guides for the springs, as shown in the accompanying drawing, these having a threaded end to go through the hole just drilled and take a retaining nut on that end, also with a ring shaped boss to bear against the flat bar's upper surface and a long pin-shaped end to act as the guide. Bolting these in place on the bar, the apparatus is ready.

Put a pair of springs to be tested on the spring guides, lay the flat plate across both, a central hole in this receiving the main bolt. This plate carries a pointed or indicating needle at each end, and the whole should be fixed in a vise or elsewhere so that these can travel over the surface of the scales previously mentioned. A reading should be taken when the plate is placed in position, that is with the springs fully expanded; then the single central nut should be screwed down gradually, compressing the spring. This can be continued until the scales show the amount of compression equal to that existing when the spring is in place on the engine and working. From the pressure required to screw it down thus far, the correct or incorrect pressure may be judged.

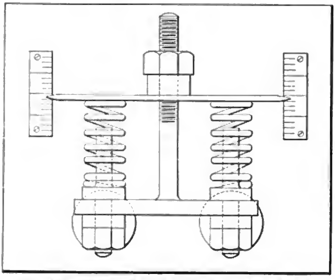
Repair shops doing a great deal of this work would do well to rig this outfit up in a somewhat permanent manner, with fairly long scales, set exactly parallel, with long spring guides, with a large enough central bolt to test out any form of small coiled spring and with accurate pointers for the ends. By using known springs, the scales can be calibrated in pounds as well as fractions or decimals of an inch, so that the test will show the pressure exerted in pounds as well as the compression in inches.

How to Clean a Radiator

One of the greatest sources of trouble with a cooler is the presence of any grease or other foreign matter upon the tubes either inside or out. In a certain case it was found that this was getting clogged and therefore inefficient for its duty of cooling the circulating water passing round the engine, and ordinary methods of cleaning did not appear to be available. For this reason the following method of attack was adopted. It was first of all regarded as necessary to remove all grease in the interior of the radiator tubes and this was done by putting about one pound of soda in a gallon of water, and with this solution the radiator was filled up. The engine was then run until the water began to boil and when this was observed and while the water was still hot it was drawn off.

When this had been accomplished the radiator was taken down and rinsed out with clean water, and similar attention was given to the water jacket and cylinder. Corks were then obtained, and by means of these the openings of the radiator were plugged up, after which the radiator was filled up with strong spirits of salts and allowed to stand for 30 minutes. Next the water outlet of the engine was corked up, and this water jacket filled with some of the spirits of salts, being allowed to remain for about 10 minutes. The liquid then was drawn off from the bottom outlet of both engine and radiator, and care was taken to wash out the interior parts of these chambers with some strong soda water in order to remove any acid which might be left. It was found that this method acted quite satisfactorily in removing any lime incrustation or deposit which was present in the radiator and engine jacket, and it was this deposit which was tending to cause overheating of the engine. It will probably be found in adopting this method that it will be advisable to keep a little soda in the water for a few days in case any of the acid used in the process should have been left behind. It is of course most important to remove all traces of acid, as anything of this nature which was left behind would probably tend to eat away the solder of the joints. If this is done properly and thorough care is taken to remove all traces of acid the process suggested will be found to be quite harmless to the metal parts of the radiator and engine jacket, and it has the merit of being extremely quick and certain in its action.

The whole process may be repeated with good results twice a year, that is, in the early spring and late fall, but if the water is bad, it should be done more often.



Valve Spring Testing Rig Which Is Made and Used Easily.

MUNICIPAL VEHICLE SERVICE EXTENSIONS

Western Metropolis' Motor Fire Apparatus

CHICAGO is to augment its present motor-driven fire apparatus by the addition of one or more automobile pumping engines. From six bids placed with the fire marshal on Nov. 22 a contract has been let to the Webb Motor Fire Apparatus Company for a machine to be built according to the maker's specifications. When completed the machine will be subjected to a series of tests by the Chicago department, in which it will be required to give a 70-pound pressure at a 1.25-inch nozzle through 600 feet of line, and to throw 600 gallons of water a minute through two lines 300 feet in length with 1.25-inch nozzles.

There are at present 13 combined hose and chemical motor wagons in the possession of the department, most of which are in service and giving a good account of themselves. The machine contracted for will, however, be the first motor-driven pumping engine to be used in Chicago. Chief Seyferlich questions the advisability of using it in the more congested parts of the city until more powerful engines have been tried out. In the face of the performances of motor-driven pumping engines, however, he can see no reason for standing out against them for certain kinds of work. Conditions in Chicago are particularly favorable to their use in the outskirts of the city. The streets are level and as a whole the roadways are good. Nor is the head of water required so great—in fact the horse drawn engines in use in these districts have less than half the pressure that is required of the motor-driven engine. The use of the latter in the outlying portions of the city should, according to the chief, increase the department's efficiency 300 to 400 per cent., due to the increased nozzle pressure and head of water and in the increased territory that may be covered.

How many machines will be added to the rapidly growing list of motor pumping engines in use throughout the country depends upon how well the machine meets the requirements in the tests, which will probably be held some time in the spring.

Rockford's Latest Fire Equipment

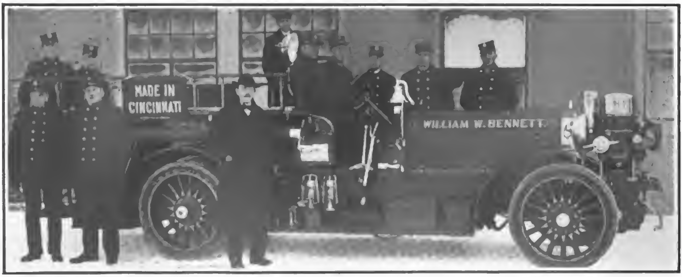
The most recent addition to the motor-driven equipment of the city of Rockford, Ill., is an Ahrens-Fox combination pump and hose wagon, the first produced by this concern. Before the city accepted it, an unusually severe test was carried out, through which the vehicle came with flying colors. The requirements called for 750 gallons of water a minute with a two-inch nozzle and in one test, the amount thrown was 880 gallons, that, too, with the thermometer at zero and against a very high wind.

In the tests the engine was blocked at the curbing and suction pipes were extended to the river, where holes were cut in the ice. The engine drew the water up 12 feet. Two lines of hose were used and in the initial test a 1.125-inch nozzle was used. With these two streams going the pressure at the nozzle was 104 pounds, and the amount of water thrown was 760 gallons a minute. Second test was with a 1.25-inch nozzle and with this there was developed 83 pounds of pressure. The amount of water thrown was 830 gallons a minute.

Tractor and Fire Engine Combination

Following a considerable success with the application of Martin tractors to the propulsion of hook and ladders and other pieces of apparatus, the Knox Automobile Company has succeeded in constructing a combination with a steam fire engine. This engine gives a result which firemen and engineers have desired for a long time—a combination of the form of pump now in use, namely, the steamer, with the more usual method of gasoline propelling.

When the latter is used alone, firemen claim that there



The First of the Ahrens-Fox Pumping Engines Sold to the City of Rockford, Ill., Recently is not sufficient power available when the fire has been reached. On the other hand, steam for actuating the unit has never been a success. This new group would seem to silence all objections to motorizing existing fire department apparatus and modernizing their methods.

Unusual Vehicle for Indianapolis Department

Constructed with an idea of obtaining a speed of from 30 to 40 miles an hour the ladder truck shown in the accompanying illustration presents a number of very unusual features. This has been constructed by the Mais Motor Truck Company, of Indianapolis, for the fire department of that city. So that the truck may be driven at this high speed the weight is carried very low, and while there are nearly 400 feet of ladders, they are nested so closely that the highest point on the wagon does not measure more than five feet from the ground.

The body is mounted on a Mais internal gear chassis, and equipped with the United States Tire Company's 38 by eight-inch tires. These are the largest pneumatic tires ever manufactured, and were made on a special order for the Mais company.

Fire Fighting Apparatus in Japan

As might be expected, there are no motor-driven pieces included in the equipment of the Japanese cities, in fact the chiefs are considering the replacement of the present apparatus with more modern machines.

In Yokohama the apparatus is owned and the firemen are paid by the association of fire insurance companies. The equipment consists of five steam engines, including a fire float, aggregating 1500 gallons a minute, 51 hydrant standpipes, 28 hand pumps, two light fire ladders, and about 24,000 feet of hose. In Tokio the city owns the apparatus, which includes 11 steam pumps, 57 arm pumps, 141 hose carts, 20 hose wagons, and halberds, hose, lanterns, fire hooks, nets and signal flags. All the apparatus for both cities was purchased in London, but it is doubtful if any but the larger pieces will be bought abroad in the future. The equipment used in the smaller cities generally consists of a steam pump, in cities where the houses are crowded together, hose cart, hand pump and small hand apparatus.

In the ordering of the latest material, there is an excellent opportunity for the inclusion of some motor-driven pieces.

Patrol Wagon for Atlanta Police Department

New Hurry-Up Wagon for Atlanta Police Department, Made by Lozier Company

As showing the great progress which is being made in the South along commercial vehicle lines the illustration herewith is notable. This is a 10-passenger vehicle, exclusive of driver and attendant, which has just been placed in service at Atlanta, Ga. The chassis and body were built by the Lozier Company, the power being a six-cylinder type of motor of this concern's standard size. The interior is equipped with stretcher, thus making it available for ambulance purposes, while the other fittings are up to the usual Lozier standards.

Miscellaneous Municipal Notes

Binghamton, N. Y., wants an automobile patrol.

Macon, Ga., has received its automobile engine from St. Louis.

Joplin, Mo., has put its new patrol wagon into active service.

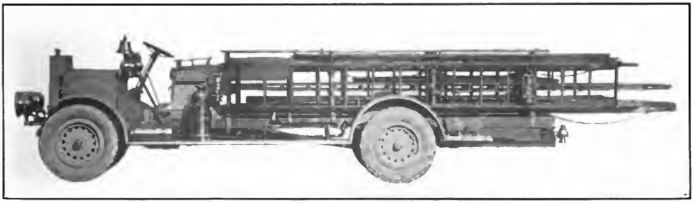
Topeka, Kan., has purchased a new combination automobile for the fire department.

Atchison, Kan., has ordered a motor-pumping engine and a combination hose and chemical.

By its latest purchase Los Angeles becomes the possessor of no less than seven motor-driven pieces of fire apparatus.

Guatemala has under construction in a Western city three chassis equipped with rapid-fire guns, capable of 600 shots a minute.

Fire Chief Hunter of Springfield, O., is trying to emulate his fellow chief in the Massachusetts city of the same name, and wants the immediate purchase of four combination chemical and hose wagons.



High-Speed Ladder Truck Constructed for Indianapolis by the Mais Company. Note Immense Pneumatic Tires

Harking Back Half a Decade

IN the April, 1906, issue of the COMMERCIAL VEHICLE the following very interesting items appeared:

Although the possibilities of the automobile as applied to the use of an army in time of war are unquestionably of great tactical value, but little actual knowledge has resulted from the introduction of this modern method of transportation in the wars of the last few years. During the recent war in South Africa only two small cars were used in the field, one by General French and the other by an officer of the Royal Engineers, whose car was provided with a trailer carrying a searchlight and dynamo, the necessary power for the generation of the current being obtained from the engine with the car at rest.

Hartford, Conn., has always been partial to vehicles that go by their own power. The big Jumbo propeller was one of the first automobile fire engines made, and it has been on duty here for many years. Years ago it was one of the sights of the town, as such machines were unknown in other places, and visitors were taken down to see the monster fire engine "that went by itself" before they were shown the museums or the site of the Charter Oak. New York and Boston did not take kindly to these big machines because they frightened horses; that was before the day of the automobile. But Hartford has always taken a good deal of pride in the big machine, and a few years ago another was made for the fire department even bigger than the famous Jumbo. This city also had the first electric patrol wagon. Lew Dockstader came here the day it was put into service and one of his minstrel jokes was about the necessity of getting drunk in order to be sure of a ride in an automobile.

LONDON, March 16.—If there is one branch of the automobile industry in which Britain just can claim to lead, it is certainly that of the manufacture of commercial vehicles. From 1801, when Trevithick ran the first practical road locomotive ever built, a constant succession of inventors developed the mechanical propulsion of road vehicles, and had not their efforts been stifled by opposition and adverse legislation, who can say what magnitude the industry might not now have reached. After a long period of inaction some attention was paid to the development of steam tractors about the year 1880, and even now several makers retain modified forms of steam vehicles which were brought out in 1883 or 1884. Much progress was prevented by the law which allowed a maximum road speed of but four miles an hour, and it was not until the repeal of this enactment in 1896 that makers of commercial vehicles were enabled to work on business lines. When at last Britain was able to start active competition with her rivals, who had by now gained a considerable lead, manufacturers did not devote their attention wholly to pleasure cars, and unlike the French, realized that the commercial world offered a far wider field for development than the pleasure or sporting side.

Probably the largest field for sales operations that awaits cultivation by the commercial vehicle builder is the retail shopping trade. The present is the time of missionary effort, in which conviction must be carried direct to the mind of the user who has his pet prejudices and theories about the transportation of merchandise in the ordinary conduct of his business. At a later period, however, the vehicle builder will have a powerful though usually unrecognized aid in the customer of the retailer, who neither has now nor will have any direct interest in the commercial vehicle. To-day, in communities in which the commercial vehicle has been put in service, even to only a very limited extent, the influence of public approval is being felt by business men; both those who have power vehicles and those who have not. By the use of the power vehicle the merchant is able to deliver his goods with a degree of promptness and over long distances, utterly impossible with horse-drawn vehicles.—Editorial.

Bailey, Banks & Biddle, Philadelphia, silverware and jewelry house, have had two eight-horsepower Cadillacs in constant service since Oct. 15 last. Both are in charge of good men, who spend an hour each morning putting their engines in shape for the day. The result is a total of more than 3000 miles for the cars in four months, with but $3 in repair bills—and that for tires.

In Indianapolis the commercial vehicle was originally introduced as more of an advertising proposition than anything else, but it has since been found to be sufficiently practical to warrant its adoption by a large number of the principal business concerns of the city. Nearly nine years ago (1897) the first car of this type was brought to Indianapolis by the New York store and placed in its delivery service. It was a Pope electric, and although changes have been made on it from time to time, and several sets of tires have been required, the car is still in service, covering about 30 miles daily. One year ago a car of the same make was added to the company's delivery service, and the two cars do practically all of the concern's delivery on the paved streets.

The question of the employment of motor vehicles for commercial purposes in Winnipeg has received very little attention up to the present, only one firm having experimented along these lines.

CAROLINA PLANT SOLD TO TRUCK MAKERS

An item which may have a large bearing upon the future of some of the commercial vehicle manufacturing concerns situated in the North is noted in the statement from a Southern paper, that capitalists have bought a wagon plant and will turn it into a truck factory. The capitalists referred to are the backers and financial men of the International Motor Company, while the factory purchased is that of the Piedmont Wagon and Manufacturing Company of Hickory, N. Carolina. The huge wagon building will have its capacity doubled during the present year.

Commercial Motor Vehicle Patents

Hale Individual Tire Mounting

DURING the past year no one part of the motor-driven vehicle has received more attention from inventors and designers than the tire and its method of fastening, with the result that many improved forms have been evolved. In the Hale device, shown herewith, provision is made for retaining a single or dual tire by means of a set of wedge-shaped cleats. The normal wheel band is designed to carry one set of wedges, while below the tire with its metal base band is another set. The latter (or the former) may be spread by means of a series of bolts, arranged with a lock nut so that motion one way spreads them and in the opposite draws them together.

1,013,387, issued to James E. Hale, assignor to the Goodyear Tire & Rubber Co., Akron, O., Jan. 2, 1912.

Removable Leather Tire Treads

By making the central or tread portion of his tire removable and of leather, Freschl, a Chicago inventor, hopes to gain longer life than is possible with rubber, and replacement of one worn form with another new one. The tread is made in sections with dovetailed ends so as to catch into the portion on each side, while the fastening means is through bolts. For the latter purpose, the rubber and fabric part of the tire is built into a U shape with a central flat circumferential groove for the base of the leather and side members or flanges projecting upwards.

1,013,596, issued to A. Freschl, Chicago, Jan. 2, 1912.

Spring Hubs for Easy Riding

Another device designed to produce similar results to special tires is the spring hub. In the Pickens form, illustrated herewith, a set of leaf springs rests upon the skein of the hub with coiled springs between it and the fixed portion of the wheel. The leaf springs give a primary cushioning action and the coiled members a secondary resiliency. The construction is such that the latter are housed within the hub and thus are not exposed to weather conditions or water from the streets. In addition, the leaf springs are removable from the outside by taking off a couple of small screws. The spokes are mounted on the leaf springs to get the full movement.

1,013,436, issued to Davis A. Pickens, Mendenhall, Mass., assignor of half to J. L. Barefoot, Mendenhall, Jan. 2, 1912.

Another Form of Spring Wheel

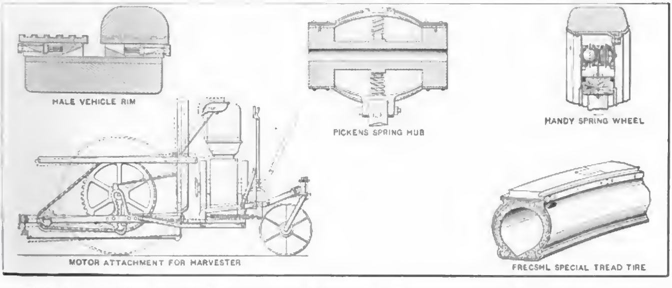
This inventor has obtained his cushioning effect by means of lateral instability, so to speak. The side plates of the wheel are of metal and very thin so as to yield in a vertical direction. By means of internal springs this movement is limited by restricting the amount of possible lateral movement away from one another while balls, apparently of rubber, limit the motion.

1,013,994, issued to Levis Gessford Handy, Rutherford, N. J., assignor to William C. Dickerman, New York City, Jan. 9, 1912.

Handy Harvester Motor Attachment

In these days of motor-driven farming implements there are thousands of perfectly good pieces on farms which the owners would like to replace with the more up-to-date forms. To meet an apparent demand of this kind the motor attachment should be a big thing for both farmer and maker. The one depicted on this page is for a harvester and consists of a three-legged carrier with a means for attachment to the frame.

1,014,823, issued to Lud Holland-Letz, Chicago, assignor to the International Harvester Company, a New Jersey corporation, Jan. 16, 1912.



HALE VEHICLE RIM

PICKENS SPRING HUB

HANDY SPRING WHEEL

MOTOR ATTACHMENT FOR HARVESTER

FRECSHL SPECIAL TREAD TIRE

Accessories and Attachments for Motor Business Vehicles, Showing the Latest Ideas of Inventors and Designers for Commercial Car Betterment

New Commercial Vehicles and Accessories

Complete Details of the New Locomobile Five-Ton Truck, Which Has Just Been Placed on the Market by This Old Established Concern—The Aries Imported Line of Heavy Vehicles with Steel Tires

THE latest addition to the ranks of commercial car builders is the Locomobile Company of America, Bridgeport, Conn., which has produced a five-ton chassis of many refinements and improvements. After testing this out for a very extended period with such loads as it would be required to carry in actual practice and under regular working conditions, the company now is prepared to place the chassis upon the market. In conformance with this concern's high standard, the vehicle includes in its composition the very highest types of alloy steels and other metals. The object has been to evolve a truck which would perform maximum service with minimum cost and attention, and under the most trying conditions.

The general design is what has been called the American or driver over the motor form, as compared with the European or driver behind the engine type. In this the company refers to the fact that it affords a maximum platform space and carrying capacity for the wheelbase, gives a very small turning radius, and by raising the driver to a greater height, enables him to have an unobstructed view in all directions and thus handle his truck more easily and with less loss of time.

From the users point of view it should be pointed out that with a wheelbase of 140 inches and a tread in front of 65 inches, the vehicle will turn in a circle of 27.5 feet radius or 55 feet diameter. This means that it can turn around completely without backing up in any street or road of a width greater than 55 feet. When the number of turns made during a day be considered it can be realized that this will save from three to five whole working days during the year. These figures, too, mean that standing at right angles to the curb with the front wheels canted to the limit, the truck could complete its turn in a 30-foot street. Considering the many narrow crooked streets of the business portions of our large cities, the value of this cannot be overestimated.

The size of the motor and its position in the truck were selected as a matter of balance, the balance of power and strength in one case and distribution of weight and load in the other. This is such that the weight empty is carried 55 per cent. on the rear wheels and 45 in front, while with a capacity load, the distribution is 70 per cent. in the rear and 30 at the front. This arrangement gives good traction at all times without loading the wheel beyond its effective adhesive weight, lightens the load on the front wheels, offers a minimum of resistance and makes steering easy. It also equalizes the tire wear so that neither set wears out before the other.

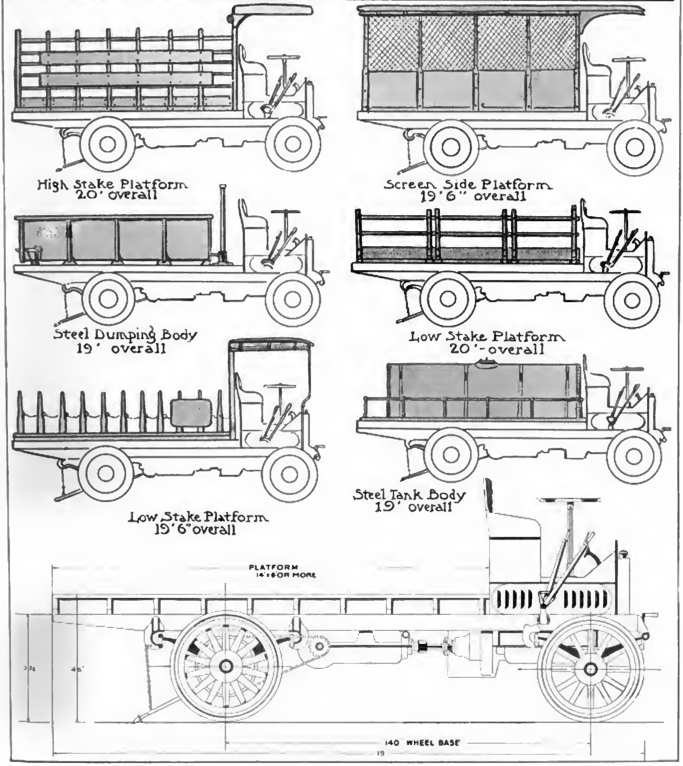
These points are of importance to the buyer because too great a load in front wears those tires out very quickly, makes steering difficult and thus calls for extra maneuvering, which in turn makes the wear greater. Too large a proportion of the load carried behind calls for unusual tire sizes there or else results in extra wear, this being noted in wheels, axles, springs and other parts as well as tires. Too much forward weight reduces the traction which the rear wheels have and thus brings about an ineffective drive unless the vehicle be heavily loaded at all times.

The motor is of the four-cylinder, water-cooled type with T head cylinders, that is, having the valves on opposite sides. It has a five-inch bore and a stroke of six inches, developing 45 horsepower at 900 rpm. Like other parts of the car, it was designed for truck work, no pleasure-car parts being employed anywhere in the vehicle. Valve diameters are larger than is usual in this size to give a more free flow of gases in and out and a reduction of their velocity. The valve stem guides are removable and can be replaced when worn.

To eliminate stresses due to unequal expansion under heat, the exhaust manifold is made in two parts, one telescopes into the other. The lubrication is of the greatest importance to the user, for upon its simplicity and thoroughness depends to some extent the life of the car. This is of the self-contained, continuous flow type. It has been proven both simple and economical. When installed it cannot be altered by the driver, thus insuring

Front View of the New Five-Ton Locomobile Truck

Wheelbase	140 In	Clearance Front Axle	17 In	Width of Frame	40 In
Tread Front	65 In	Turning Radius	27.5 Ft.	Wheel Diameter (actual)	34 In
Tread Rear	70 In.	Width Overall without Body	85.7 In	Height of Platform Necessary to Clear Wheels (40 in)	about 44 in
Overall Length Chassis	19 ft.	Horsepower	45 at 900 RPM	Platform Height Unloaded	49 In.
Final Drive Double Chain		Bore 5 In.	Stroke 6 In.	Platform Height Loaded	46 In.
Length Platform Space	14 ft or more	Tires-Front	40 by 6 Single	Special Features-Steel Wheels, Differential Lock, Sprag, High Grade Materials, Liberal Bearing Sizes.	
Height Driver's Seat	72 In.	Tires-Rear	40 by 6 Dual		


High Stake Platform 20' overall

Screen Side Platform 19' 6" overall

Steel Dumping Body 19' overall

Low Stake Platform 20'-overall

Low Stake Platform 19' 6" overall

Steel Tank Body 19' overall

The Locomobile Five-Ton Truck Chassis with Six Suggested Body Forms and the Principal Dimensions

Cast Steel Wheel and Rubber Tire Used on Loco Truck

an even and correct flow of lubricant at all times. Other parts of the car are oiled or greased by suitably placed oil or grease cups, every moving or turning joint being so equipped. The transmission is supposed to be filled with grease or heavy oil, the lower portion constituting an oil pan, which may be drained and removed in a few seconds. In the case of the spring link bolts, the hardened steel pins passing through the bronze bushings are welded to one shackle, making a unit and preventing movement. These pins are provided with grease grooves and are drilled to facilitate the grease passage from the cups which are cut from the solid and made an integral part of the bolts.

To return to the motor, long life and efficient service is provided for by the main bearings. These are made very long and large to give a very small pressure on each unit of area. Five bearings are used, each 2.25 inches in diameter, with a total projected area of 41.34 square inches. As compared with the company's pleasure and public service cars, the latter have motors with but 21.54 square inches, so that the truck has twice the area. This must result in longer life and less trouble during that life.

Large bolts and nuts are used throughout with cotter pins, castellated nuts or spring washers wherever the nature of the part calls for absolute certainty of retention. Cylinders, rings and pistons are ground to size, the latter carrying four rings above the pin. All castings are annealed to eliminate internal stresses. The crankcase is of bronze, hung from a pair of three-inch steel tubes at the front and rear, these in turn being supported by cast-steel brackets bolted into the frame. This method of support makes it very easy to remove the motor and eliminates any strain from the crankcase or bearings.

The carbureter is of the Locomobile standard design, float feed type, with a single jet, and is fitted with hot-water jacket and hot-air regulator. High economy, flexibility and general satisfaction are claimed, while its simplicity does not call for any attention.

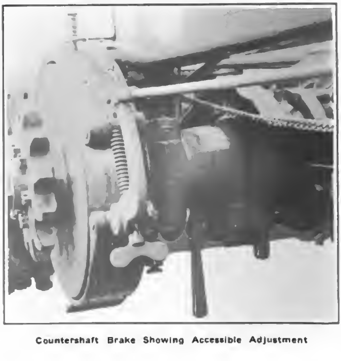
The clutch is of the dry disc form with 14 plates, seven attached to the flywheel, which houses the unit and the others mounted on the clutch retainer. All are sheet steel, the latter being lined with a heat-proof material. The transmission is a unit with the differential and contains the wide-faced gears. The case is of manganese bronze, the upper half carrying the bearings, constituting the main portion, the lower part being but an oil pan of aluminum. The case has a three-point support, the forward point being a hinge on the frame cross member, while the two rear ones are spherical bearings in cast-steel brackets bolted to the chassis side members. This prevents distortion or cramping of the bearings.

Final drive is by double chains, and transmission, jackshaft and wheels are mounted upon large roller bearings. Those in the rear wheels are guaranteed to carry 17,500 pounds. Brakes are large and efficient, as well as easily adjusted by means of an external wing nut. The contracting forms are on the countershaft ends, while those in the rear wheels are operated by the lever and are of the internal expanding form. The foot brakes have an effective area of 225 square inches and the other of 355 inches, making a total of 580 inches. Either set will hold the truck on any hill with full load. To prevent backing down any slope, a pair of sprags is fitted at the rear end, these being dropped by raising a chain on the steering post.

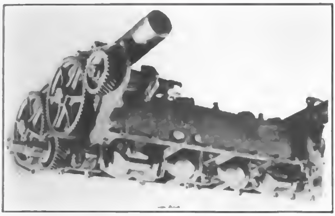
The driving sprocket has 12 teeth and the driven 35, a 2.92 reduction. The gear reductions and the speeds produced by them are as follows:

Speed	Reduction	Vehicle Rate MPH at 900 RPM
1st	40.75	2.6
2nd	19.80	5.4
3rd	13.40	8.0
4th	10.42	10.25
Reverse	53.40	2.0

Springs are large, the rears, for instance, being 50 inches long by three inches wide. They have a normal carrying capacity of 6000 pounds each, or six tons total. On the basis of the load distribution previously mentioned, this gives an excess capacity of more than 70 per cent. A helper spring, also three inches wide, is hung over the rear axle to absorb severe road shocks and pre-



Countershaft Brake Showing Accessible Adjustment



Crankcase of Motor Showing Supporting Tubes and Bearings

vent rear spring overloading. This adds to the excess capacity.

This is not provided to carry overloads as to total weight, but to care for such unusual cases as a capacity load, concentrated in a single casting or piece set so far back on the body that its whole weight will be supported by the rear suspension. Fronts are three inches wide and 42 inches long. They have a capacity of 2000 pounds each.

The frame is unusually strong, being of pressed alloy steel throughout. The side members are of a channel section, six inches deep by 2.5 wide at the flange and .3125 thick. There are six heavy cross-members, all of which are reinforced by heavy steel gusset plates top and bottom. Few holes are cut through the frame but the necessary ones are drilled and reamed instead of being punched.

Cast steel wheels are fitted, as having a lighter weight, greater strength and superior resiliency. The size is 40 inches, to which are fitted six-inch single solid tires in front and dual sixes in the rear. These are interchangeable so that with unequal wear the fronts could be put on the rear wheels and a pair of the rears on front. This equipment carries with it a guarantee of from 8000 to 10,000 miles, according to the make. As these are more than 10 per cent. over the required sizes for the load and dead weight, no greater guarantee would be obtained by putting on larger tires. The present 140-inch wheelbase is the only chassis built, but a demand for other sizes will be dealt with when it arises.

Any form of body will be applied, sketches herewith showing a number of the forms in common demand applied to this chassis.

Any unit may be removed readily and rapidly, accessibility being a prominent and emphasized feature. The superstructure carrying the driver's seat is so arranged as to be taken off easily, the seat tilting back, while floor plates and side members remove. The radiator is set on rubber blocks and can be taken out quickly. Motor, clutch, transmission, axles or other smaller units may be taken out with equal facility, all of them without removing the load. This is of prime importance, as it enables road repairs to be made without disturbing the contents of the body.

The motor speed, and consequently that of the car, is governed by a unit of the ring type, which prevents the former exceeding 900 r.p.m. This is arranged so that it is sealed at the factory and cannot be tampered with by the driver.

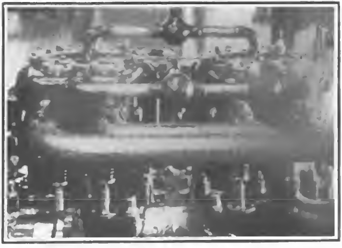
Control is simplified by placing the levers within the driver's reach and proportioning their lengths to the work, and by eliminating the spark lever. The magneto firing point is fixed at the factory and is earlier than that of the battery ignition system. A foot accelerator gives the operator the use of both hands in traffic congestion and at the same time complete control of the motor speed.

Imported Vehicle with Many Features

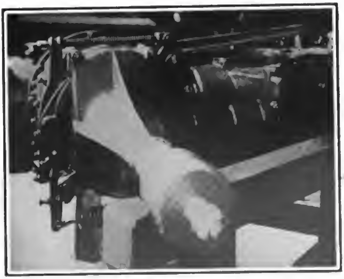
CHARACTERIZED by many unusual features, the Aries heavy truck which is being imported into this country from France is making an excellent record for itself in actual service. One of these vehicles, of seven tons' capacity, has been in the service of a Brooklyn brewer for about eight months, in which time it has covered almost 7000 miles without a cent's expense for repairs. This firm, which operates no less than 18 trucks all told, is firmly convinced of the utility of steel tires for heavy city trucking and will add to its steel-shod vehicles in the near future.

The wheel and tire on this vehicle, upon which a 60,000-mile guarantee is extended, are not the only features of this vehicle. In the illustrations herewith several others are brought out. Thus, the motor is equipped with a double exhaust pipe for the purpose of carrying off the burned gases more rapidly than would be possible with a single straight manifold. Then the springs have an unusual form which is most efficient, the shackles being attached to the frame in such a manner that one side may raise and the other not, without twisting the frame or springs. The oiling system also is different from the usual form, but in effectiveness is beyond criticism.

In the French military trials, this make has been uniformly successful. In the first year it was one of two



Left Side of the Aries Motor with Double Exhaust Pipe



Transmission and Countershaft Brake on the Seven-Ton Aries

to gain an award, in the second it secured a vehicle in every category with a government subsidy, the only one to gain this signal honor. For the reason that all the cars turned out by the firm were subsidized, no competitions were entered for several years, the subsidy covering a period of three years. Other details of the parts may be noted in the two illustrations herewith, these depicting respectively the left side of the engine, which brings out the double exhaust pipe, and the cast-steel transmission case with the very large steel-lined countershaft brake.

For the trials of 1912, which will begin in June or July, this firm has entered no less than six vehicles in as many different categories. Apparently, the concern is determined to make another clean sweep as it did in 1908 and 1909.

Special attention is called to the control mechanism of these trucks, not shown by means of a picture. Two pedals and the usual complement of side levers constitute everything beside the steering wheel. The usual spark and throttle levers are eliminated in the interests of simplicity, the magneto having a fixed spark, while the carburetor control is centered in a small finger lever on the dash, which may be connected with a pedal if desired. In this case the driver would be left with both hands free for steering, controlling the motor speed with an accelerator pedal. The clutch pedal interconnects with the speeds so that engagement of a gear is not possible while the clutch is out.

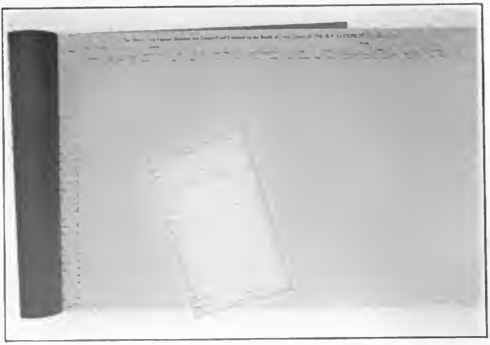
Test of New Gasoline Railway Car

THE Nevada Copper Belt Railway has recently received a combination gasoline driven railway motor car from the Hall Scott Company, of San Francisco. This measures 55 feet overall and will accommodate comfortably 70 passengers; seats are wide enough to seat comfortably three passengers and still leave room for an aisle 18.5 inches wide, the car being 10 feet three inches in width. The car was given a severe test while being run from the works of the company at West Berkeley, Cal., to Mason, Nev., a distance of 337 miles. It traveled over the lines of the Southern Pacific, and had to make a long climb of 69 miles east of Sacramento, Cal., with a maximum grade of three and a minimum of two per cent. It did this in a satisfactory manner and would pick up on the grades to a speed of 15 to 20 miles an hour on the third speed. On the descent, however, the officials of the Southern Pacific not wishing to risk the car descending alone, ordered a freight engine to pilot it down to Truckee. From Truckee to Sparks, Nev., the run was made in fast time, the car attaining a speed as high as 55 m.p.h.

Throughout the West and Southwest, the gasoline-driven railroad coach for use on suburban and feeder lines is making rapid progress.

GASOLINE RAILWAY CAR IN THE SOUTH

The Yazoo and Mississippi Valley Railway has put on a new gasoline motor car to operate between Baton Rouge and New Orleans. This takes the place of the old car and is of larger capacity as well as being able to haul a trailer when necessary.



Motor Truck Expense Report Blank and Daily Record Card Being Distributed Free by the Goodrich Company

Of Interest to the Motor Wagon Industry

With the Agents and Dealers

THE **American Agencies, Ltd.,** 608 South Olive street, Los Angeles, acting as Pacific Coast agent for Eastern manufacturers, is making arrangements to open additional offices in San Francisco, Portland and Seattle. The company is now in a position to take Eastern lines and place them effectively in the hands of both jobbers and retailers on the Pacific Coast.

The Lippard-Stewart delivery car is handled in Columbus, Ohio, by Dean DeWitt.

Edwin W. Jennings Company is handling the Lippard-Stewart delivery cars in Bridgeport.

John W. Gillies has secured the Franklin in Haverstraw, N. Y., for the present season.

Neely & Ensor have taken the agency for the Lippard-Stewart Motor Car Company in Baltimore.

The Lippard-Stewart agency in Poughkeepsie has just been taken by the Ryder Motor Company.

The Lippard-Stewart delivery car is now being handled in Rochester, N. Y., by Turk & Brown.

The Lippard-Stewart delivery car is now handled in Sedre Wooley, Wash., by W. H. Heinzerling.

The Everett Motor Car Company of Everett, Wash., has taken the agency for Adams trucks in the state.

The Lippard-Stewart delivery car is now handled by the Sterling Place Garage in Brooklyn, N. Y.

The Whitten Motor Vehicle Company has taken the agency for the Lippard-Stewart delivery wagons in Providence.

The Lippard-Stewart delivery car is now being handled in Newark, N. J., by the Newark Power Wagon Company.

The Michigan Motor Company, Portland, Ore., has taken the agency for the Lippard-Stewart Motor Car Company in that city.

The Western Automobile Company, St. Paul, agents for the Franklin, is having built a modern sales room in the heart of the automobile district.

The Rowe Motor Company, Coatesville, Pa., has opened an agency at 327 East 84th street, New York City, with Geo. I. Pound as general sales manager.

The Peden Iron & Steel Company, of San Antonio and Houston, and the Levy-Kramer Automobile Company, of Dallas, have taken agencies for Alco trucks.

The Colonial Electric Car Company, Detroit, has opened a salesroom and garage at 715-719 Woodward avenue, that city, and have also moved the office there.

The Philadelphia Storage Battery Company has opened a new office in the Rookery Building, Chicago. The new office is in charge of D. E. Arlington.

Findeisen & Kropf Mfg. Co. of Chicago has secured the Hall Motor Supplies Company of Toronto as the Canadian distributor, and also has added the R. C. Hull Electric Company of Cleveland.

The Boston Gear Works is represented by the following companies which carry on hand a stock of gears for immediate shipment: Montgomery & Co. of New York City, C. A. Strelinger Company, Detroit, and C. W. Marwedel of San Francisco.

The J. F. Charley Auto Company of Evansville, Ind., and the Moran Auto Sales Company, of Grand Rapids, Mich., have closed with the Velie Chicago branch for the sale of Velie commercial cars. Service stations will be established throughout the territory represented by these companies.

The Ideal Auto Company, Fort Wayne, Ind., has established the following agencies recently: John Braband & Son, Brooklyn; Johnson-Laferty Power Wagon Company, Cleveland; Miller DuBrul & Peters Co., Cincinnati; F. W. Gigax, of the Avery Company, Indianapolis; Shawnee Motor Car Company, Topeka, Kan.; W. M. Turner, Duluth; Fred Reule, La Fayette, Ind., and H. E. Buffington, Lykens, Pa.

The Auglaize Motor Car Company of New Bremen, O., is represented by the following agencies: Frank Blessing, 233-237 Ontario street, Toledo, O.; Hoyles & Moyer, Marion, O.; Monnot & Sacher, Canton, O.; Kimmel Bros., Columbus, O.; Prive Implement Company, Zanesville, O.; J. H. Hecker, Covington, O.; Mueller Implement Company, Delphos, O.; Lockhart Bros., DeGraff, O., and Edmund Lee, Tipton, Ind.

H. H. Dennis, of Toledo, O., has taken the agency for Alco trucks and cars. Other dealers with whom contracts have been closed for this product within the past few weeks are: T. A. Crow, Toronto, Can.; Franklin Auto & Supply Co., Milwaukee; Park Auto Company, Erie, Pa.; Auto Sales Company, San Francisco; Guy R. Champlain, Jacksonville, Fla.; Augustus E. Staley, Decatur, Ill.; Will-

KisselKar Three-Ton Truck on the Summit of Mount Hamilton, Cal., Which This Vehicle Climbs Six Times a Month

Henry B. Joy, President Packard Motor Car Company

iam J. Mehring, Harrisburg, Pa., and H. W. Brown, Binghamton, N. Y.

Recent Truck Incorporations

Ocean Hill Garage, Inc., Brooklyn. Capital $1,000. Incorporators: Harry Umansky, Samuel Umansky and Joseph Umansky.

Mayer Auto Specialties Company, New York City. Capital $15,000. Incorporators: Simon G. Mayer, Albert L. Kull and James McBrien.

Washington Square Taxicab Company, New York City. Capital, $5,000. Incorporators: Lorenzo A. Cuneo, William E. Podesta and Fred Cuneo.

Standard Resilient Wheel Company, Inc., New York City. Capital, $500,000. Incorporators: Joseph Gaynor, Philip B. Verplank and Solomon Jochelson.

Pierce, Wells & Keedwell Company, New York City. Capital, $10,000. Incorporators: Peter Krulder, Jr., Albert C. Keedwell and Albert D. Keedwell.

William J. Hawley Automobile Company, Canandaigua, N. Y. Capital, $30,000. Incorporators: Edson T. Case, Wm. J. Hawley and Lincoln H. Hawley.

Standard Auto Renting Company, 186 East 73rd street, New York City. Capital, $10,000. Incorporators: David C. Goodman, William Machol and Edwin B. Koenig.

Boyle Bros. & Pate Co., Onondaga Hill, N. Y. Capital, $5,000. Incorporators: William D. Boyle, Onondaga Hill, N. Y.; Jesse R. Boyle and Albert N. Pate, Syracuse, N. Y.

Wilkinson Motor Starter Company, capital $50,000; to manufacture and sell motor starters.

Cincinnati Motors Company, Cincinnati, capital $500,000; to manufacture motor trucks. Incorporators: F. Alter, J. B. Doan, H. T. Alter.

Englewood Auto Livery Company, Chicago, capital $5,000; to manufacture motor vehicles and accessories. Incorporators: G. E. Beale, J. J. Ahern, E. T. Fidler.

Buffalo Electric Vehicle Company, Buffalo, N. Y. Capital, $1,000,000. Incorporators: William J. P. Seipp, William C. Feuchter and Thomas R. Wheeler, all of Buffalo.

Great Eagle Motor Device Company, Dover, Del., capital $130,000 ;to manufacture and sell self-propelled vehicles of all kinds. Incorporators: G. Hagstrom, I. Hagstrom, H. W. Davis.

Bingham Motor Car Company, Cleveland, capital $10,000; to manufacture motor trucks. Incorporators: H. Bingham, C. N. Fiseus, C. F. Schrod, E. E. Thomas, W. H. Gille.

United States Starter Corporation, capital $10,000; to manufacture and deal in motor starters and other accessories. Incorporators: Jacob G. Merithew, Frank S. Salter, William A. Staley.

Swiss Magneto Company, Buffalo. To manufacture magnetos, etc. Capital, $250,000. Incorporators: Harry S. Martin, Dunkirk, N. Y.; A. A. Meggett, Chicago, and Bradley H. Phillips, Buffalo.

Auto Mechanical Devices Company, New York City. To manufacture devices of all kinds for automobiles and engines. Capital $10,000. Incoporators: Louis H. Smith, John Sommer and Henry G. Ingersoll.

O. E. Short & Co., Inc., New York City. Capital, $25,000. Incorporators: Orville H. Short, 15 West 91st street, New York City; Harlan W. Short, Morsemere, N. J., and H. L. Starr, 1208 Clay avenue, New York City.

Twyford Auto Manufacturing Company, Houston, Tex., capital $400,000; to manufacture and sell motor trucks. Incorporators: M. J. Moore, J. N. Groesbeck, M. J. Moore, Jr., R. E. Twyford, F. M. Robinson, W. E. Richards, W. C. Berry.

Factory Additions and Enlargements

Henry Lee Power Company, Chicago, has had erected a three-story building in West Ravenswood to be used as a factory for Old Reliable motor trucks.

The Franklin Automobile Company on July 1st will move from 406 Golden Gate avenue to its new quarters on Polk and McAllister streets, San Francisco.

The Alumaloyd Products Company, Canton, O., capital $250,000, has acquired the business of the Alumaloyd sheet department of the Stark Rolling Mill Company of that city. R. A. Bartholomew is general manager of this company.

Monitor Automobile Works of Janesville, Wis., has moved its general sales and publicity department to Chicago, and from now on all business pertaining to sales and agencies will be conducted from the new headquarters at 1421 Michigan avenue.

Willys-Overland Company is planning for the erection of a new addition to its plant. The structure will be erected on the 15-acre Ellis tract recently purchased. This company is also having plans drawn for a new three-story office building.

Brief Personal Mention

J. H. Bowden has been appointed sales manager of the Wallace Motor Car Company of Newark, N. J.

S. T. Manlove has succeeded A. J. Gorget in the purchasing department of the Beaver Mfg. Co., Milwaukee.

C. C. Gehring has succeeded T. R. Burton in the Pittsburgh branch office of the United States Tire Company.

R. C. Hoffman has been appointed head of the engineering department of the Beaver Mfg. Co., Milwaukee.

T. J. Mills has been appointed office manager of the Seattle branch of the Goodyear Tire & Rubber Company.

C. A. Gilbert has taken the place of J. C. Western as manager of the Western branch of the United States Tire Company.

John F. Cotter has been appointed assistant to Scott Brown, of the Studebaker Corporation, at South Bend, Ind.

T. R. Burton has been appointed assistant manager of the New York City branch of the United States Tire Company.

Charles Fisher has opened a branch for the Universal Motor Truck Company of Detroit at 2216 Michigan avenue, Chicago.

W. F. Winkelman and L. F. Johnson

W. D. Edenburn, Publicity & Advertising Manager Remy Company have been appointed traveling sales representatives of the American Locomotive Company.

Curtis G. Lee, of New York City, has associated himself with the Commercial Car Sales & Service Co., 918 S. Michigan avenue, Chicago.

C. M. Dow has accepted the position of special sales representative of the Metzger Motor Car Company in the Southern States.

C. D. Colby has charge of the sales of the Pope-Hartford Motor Car Company, St. Louis agents for the Pope-Hartford truck.

O. L. Green, auditor of the Beaver Mfg. Co., has resigned his position on account of ill health. He is succeeded by F. S. Johnston.

Charles A. Trask has severed his connections with the Cartercar Company as chief engineer and works manager after five years of service.

T. J. Jones, of the Studebaker Corporation's sales force, has been assigned to the Pacific Coast. His headquarters will be located at San Francisco.

John L. Bender, of the American Ball Bearing Company, is now vice-president and assistant manager of the Croxton Motor Company of Cleveland.

H. H. Cowley, formerly of the Bergdoll Motor Company, has joined the R-C-H Corporation and will be connected with the New York branch.

Homer Warren has been elected president of the Detroit Board of Commerce, succeeding Milton A. McRae. Mr. Warren is president of the Warren Motor Car Co.

Gleeson Murphy, who has just been made vice-president of General Motors Truck Company, is also assistant to President Neal of General Motors Company proper.

W. E. Wright, Vice-President and General Manager Knox Automobile Company

B. H. Decker is head of the production department of the Beaver Mfg. Co., Milwaukee. He was formerly connected with the Stevens-Duryea Company and the Thos. B. Jeffery Co.

Charles Langmaid has resigned his position as manager of the Boston branch of the Autocar and is now in charge of the New England branch of the Federal Rubber Company of Boston.

Fred E. Bradfield has been appointed manager of the Velie Motor Vehicle Company's branch at Boston, which covers the New England States. He was formerly manager of this company's branch at Chicago.

J. P. Patterson has been appointed manager of the Firestone Tire & Rubber Co. to take charge of the St. Louis branch. George M. Martin, whom Mr. Patterson succeeds, has been transferred to Minneapolis.

Fred A. Harris as supervisor will care for the Middle District, having charge of the branches of the United States Motor Car Company at Chicago, South Bend, New Castle, Indianapolis and St. Louis, with headquarters in Chicago.

J. E. Norling, secretary and treasurer of the Monitor Automobile Works, will manage the new Chicago office of that company and will have as sales manager F. W. Stewart, formerly with the Badger Motor Car Company.

S. D. Porter is appointed supervisor for the Western District of the United States Motor Car Company, including the branches at Minneapolis, Kansas City, Des Moines, Omaha and Dallas, with headquarters at Kansas City.

E. E. Hart, formerly of the Chalmers Motor Company; E. G. Richardson, of the Abbott-Detroit Company, and W. B. Smith, of the Hupp Motor Company, have joined the R-C-H Corporation and will be connected with the New York branch.

Ernest H. Brandt will have charge as supervisor of what is known as the New York District of the United States Motor Company, including the branches, and dealers under them, operating at New York, Albany, Syracuse and Buffalo, with offices at New York.

Recent Trade Printed Matter

Schmidt Bros. Co., Chicago, has issued a catalogue showing different styles of trucks.

Wisconsin Motor Mfg. Co. has issued a catalogue showing gasoline engines for truck purposes.

The Autocar Company is issuing its latest catalogue illustrating different models of motor trucks.

The Motor Starting Company, Indianapolis, is issuing a folder illustrating the Shur-Go gasoline starter.

Gleeson Murphy, Vice-President General Motors Truck Company

The "Bosch News" for March contains an interesting article on the subject of high-tension spark plugs.

The Firestone Tire & Rubber Co. has just issued a booklet entitled Minor Repairs and the Care of Tires.

Tapley Specialty Company recently issued a catalogue giving different views of the Tapley elevating truck.

The January issue of the General Vehicle Company's booklet entitled *Elec-Tricks* contains a very interesting account of that firm's service department.

New Departure Mfg. Co. of Bristol, Conn., is issuing an interesting and valuable catalog-treatise prepared by the company's staff of ball bearing specialists and engineers.

The New York Gear Works, Brooklyn, under the title of Ball Transmissions, has issued an attractive and finely illustrated booklet describing the well-known Ball planetary transmission gear and jack-shaft for commercial vehicles.

SKF single and double thrust ball bearings are described in a 16-page bulletin issued by the SKF Ball Bearing Company, 50 Church street, New York City. This bulletin is filled with sound arguments advocating the self-aligning double thrust and single thrust bearings with or without self-aligning seat.

Miscellaneous Notes of the Industry

The Merchant & Evans Co. is producing Hele-Shaw disc clutches for motor trucks at the rate of over 500 a month.

The Argo Electric Vehicle Company of Saginaw, Mich., has just been awarded contract by the city of Alliance, O., for furnishing a car with carrying capacity of 10 persons and driver.

The Seagrave Company, Columbus, O.,

Velie Truck with Capacity Load Which Made First Trip of the Year Between Milwaukee and Chicago Over Frozen Roads

recently received orders for combination hose wagon and engines for the following: Orange, Long Beach, Sacramento and Riverside, Cal.

Every day, from 10 in the morning until 9 at night, during the Automobile Show recently, two Mora wagons did 'bus work between the show and Superior avenue (Hollenden Hotel), Cleveland.

In the service of a Philadelphia taxicab concern, the Auto Car Service Company, 29 Lee puncture-proof tires have given a service of 153,903 miles, or an average of 5307 miles each, without a puncture or blow-out.

India rubber has advanced in the past 10 years from an average of 46.9 cents a pound in August, 1901, to 63.4 cents in August, 1911, according to a recent bulletin on the cost of living issued by the Department of Commerce and Labor.

At a recent meeting of the board of directors of the Columbus (O.) Transfer Company it was decided to increase the number of motor vehicles of the company largely. Plans are also being completed for the erection of a new building on Cleveland avenue.

Blood Bros. Machine Co., at Kalamazoo, Mich., is so rushed with orders as to necessitate full forces both night and day. Several new buildings have been added since last summer and a lot of new machinery. Their entire factory is devoted to the manufacture of universal joints.

A motor truck system of hauling freight to take the place of a proposed belt line around Jersey City, N. J., where merchants and manufacturers are not satisfied with present transportation facilities, is proposed by P. Frank Shanley, of that town. His idea is to utilize a very large fleet of commercial vehicles, preferably electrics.

The Cortland Auto 'Bus Co., which for two years past has run a very good 'bus service between Cortland, O., the highest point of the Western Reserve, and Warren, O., the county seat of Trumbull county, has been so successful that a rival 'bus line has started this summer. This is operated by Lee Sample, who is now running an eight-passenger vehicle with excellent success.

Business Troubles and Embarrassments

In Montreal it is proposed to regulate the taxicab stands by law. A bill now being prepared provides for seven stations under the regulation of the police department.

To correct the impression that the Pittsfield Spark Coil Company, Dalton, Mass., is in the hands of a receiver, that company announces that the past year has been one of the most successful it has ever experienced. The company suggests that possibly it has been confused with another ignition firm in Pittsfield, Mass., now in the hands of a receiver.

The American Ball-Bearing Company has just instituted in the District Court of the United States for the Northern District of Ohio a suit to determine the question of infringement of Baker front axle patent 753,820, by the front axle constructions of the Metal Products Company of Detroit. A test case under this patent was commenced some time ago against the front axle product of the Standard Roller Bearing Company. The latter company has recognized the validity of the patent and has taken a license under it.

Lineup of 20 Three-Ton Packard Trucks with Dumping Bodies in Use in Different Parts of Portland, Ore. Photograph Taken in Front of Agency Oct., 1911

CONTENTS

May 1912

Trucks in Packing Industry 3

Conditions under which the vehicles owned by the Chicago Packers operate, pointing out the lack of economy and those defects which must be remedied to produce it.

Commercial Vehicle Tires in England—Part II .. 10

Details of several prominent English makes of solid rubber tires and the mileage attained by them. Big mileages obtained by the 'bus companies.

Trend of the Times in Truck Work—Part IV 12

Positive method of sales attack, showing the Increase of Business argument as compared with the Reduced Cost way of interesting a prospect.

Legislative and Legal Matters of Interest 17

The legal status of the commercial car and its definition. Exceptions made in various States. Its status as a common carrier and as private property.

Motor Trucks Certain to Oust Army Mule 18

Conclusion advanced as a result of a recent 1500-mile trip of three trucks is that the mule must be ousted in favor of the truck, though the change be gradual.

Insuring the Commercial Vehicle—Part II 20

Concluding and summing up the New York situation, in which it is shown that 60 per cent of the firms interviewed considered rates too high.

The Editor's Viewpoint 22

Bookkeeping and Truck Success, Selling Trucks and Selling Service.

Manufacturers' News of the Month 23

New York Holds Annual Truck Parade, New York Receives Electric Engine, Creditors' Committee for W. C. P., Mack Interests Buy Out Lansden, New Electric Vehicle Concern, Buffalo's Million Dollar Concern.

System Used in Largest Detroit Garage 30

Method of handling commercial cars, keeping data and blank forms used in what is said to be the biggest garage in the world.

Cost of Operating Commercial Vehicles 37

What it costs to use a motor truck in various lines of business—In general teaming—Four-ton truck hauling supplies—Police patrol in Northwest—Heavy trucks in brewery work—In retail coal delivery.

Among the New Commercial Vehicles 40

A. O. Smith 3-ton truck, G. M. C. electrics, particularly the 3-ton size.

Miscellany

Makers and Dealers' Service Relations, 19; Many Commercial Vehicles in Winnipeg, 29; N. Y. Census Report Covers Manufacturers, 29; Many Vans for French Mail Service, 36.

Departments

Commercial Car Questions Discussed 26
The Truck Maker's Market 28
Electric Vehicles 34
Mechanical Notes for Truck Drivers 44
Municipal Service Extensions 46
Commercial Motor Vehicle Patents 47
Trade and Personal Items 48
New Agencies Established 50

Vol. VII No. 5

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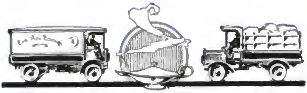

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May, 1912

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Vol. VII May, 1912 No. 5

Motor Trucks In Packing Industry

Conditions Under Which Commercial Vehicles in Service of Chicago Packers Are Operating—Statistics of Usual Day's Work—Defects Which Must Be Remedied Previous to Unqualified Success

By WILLIAM B. STOUT

OVER $40,000 would be saved to the packing industry of Chicago in extra motor truck service if the downtown dealers realized and provided for the elimination of the waste time of these machines at unloading platforms.

This waste time is costing the operators of four motor trucks to one Chicago meat firm $18,000 a year in lost truck service, while other platforms and receiving points of lesser importance are costly in proportion.

Two and 3-hour stops to deliver a load, or half a load, at one place are common, and 4-hour stops frequent, while the haul from the Union Stock Yards is but 3 miles.

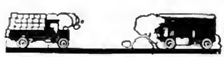
Drivers could help out this delay to a considerable extent, but owing to labor arrangements, they merely unload the meat over the tail-board of the truck and allow the firm receiving it to delay the truck in the reception of the load as much as it likes. Waiting for the return of the unloader with his hand truck, the driver cracks jokes with his neighbor or discusses anything but the matter at hand, a waste that will be eliminated before motor trucks will pay in the business district.

Sixty motor trucks are now operating out of the mile square stock yards area, situated 3 miles south of Chicago's business center, and all traffic from this area must pass over rough cobble-stone thoroughfares, hard on machines and drivers and harder on tires. Here is one reason why tires guaranteed abroad for 25,000 miles and lasting for more are good here for only 8000. At that, tires do not wear out on this service, but, as a rule, strip from the rim.

Motor Trucks in Use in Chicago Stock Yards

Swift & Co.	**10 gasoline trucks**
Libby, McNeill & Libby	**9 gasoline trucks**
***Armour & Co.**	**9 gasoline trucks** **2 electric trucks**
Morris & Co.	**3 gasoline trucks**
Sulzberger & Sons	**3 gasoline trucks** **2 electric trucks**
Roberts & Oake	**2 gasoline trucks**
Boyd, Lunham & Co.	**1 gasoline truck**
Miller & Hart	**1 electric truck**
Anglo-American Co.	**4 gasoline trucks**
Western Packing Co.	**1 gasoline truck**
Hammond Co.	**5 gasoline trucks**
Louis Pfaelzer & Sons	**2 gasoline trucks**
Omaha Packing Co.	**7 gasoline trucks**
Total	**61 motor trucks**
Gasoline trucks	**56**
Electric trucks	**5**
Horse teams	**450**

***Armour & Co. in allied industries use three gasoline trucks.**



At present 2000 tons of meat are hauled out of the stockyard limits to Chicago consumers each day, handled by horse and wagon and motor trucks.

Packers are using trucks to the congested city's center not because they pay in themselves, but because their customers demand them, and they must be up to date to hold the trade. Yet when the loads arrive the buyers furnish no adequate facilities for unloading, and, as said, waits of 3 and 4 hours are common. The packers are helpless, for if one firm objects the receiver will shift his trade. Packers do not dare to demand a change for fear of losing the business.

"If I should say to X," said the manager of one of the stockyards retail markets, "that his receiving of my goods was costing me too much money he'd say, 'keep your meat, I'll buy of Z.' We know the trouble is there, but what can we do?" This is the feeling among all the stockyards men who are in

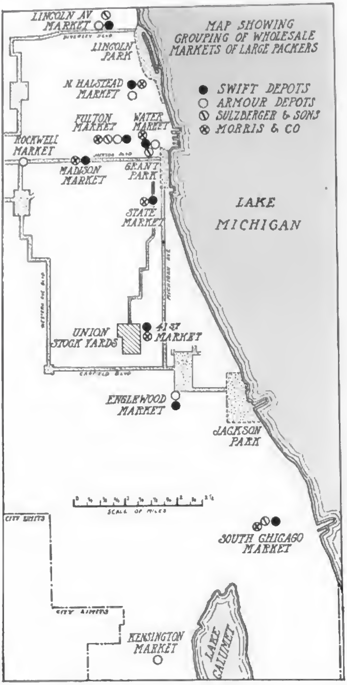


Fig. 1—Map Showing Wholesale Markets of the Large Packers and Their Distribution Over the City, Which Indicates the Routes Trucks Must Travel in Their Daily Delivery Work

touch with the situation. The receivers downtown are alive to the situation and many of them are adopting trucks in their own service to retailers, etc., but they in turn blame someone else. It is not up to them, they declare, to furnish a force of men to unload trucks there but a few hours a day. They blame the drivers for not assisting in the unloading to the markets and claim that drivers stand idle for long periods when it is not necessary, loafing on the job.

Altogether there is a great deal of interesting work to be brought to a conclusion eventually in the use of motor trucks from the stockyards district to Chicago, and a careful analysis of what is being done at present and of present conditions in all branches of the stockyards service furnish the basis for some startling conclusions.

There is much of interest in the stockyards area foreign to truck use, but which has its bearing on the future of the truck none the less. Here in this square mile 40,000 men are employed and business is done each day to the amount of $1,250,000. For the allied packers 1500 horses are at work continuously, 900 of which are engaged in hauling meat and other stockyards products to Chicago and the suburbs. These are besides the motor trucks.

These teams working to the city if placed end to end would make a line close to 2 miles long. If trucks were used, each taking the place of two teams the length of the line would be but .6 of a mile long saving 1.4 miles of street room to Chicago or 70 per cent.

Grouping of the Big Packing Houses

The larger packers in the yards have their own substations or wholesale markets scattered about the city through which their deliveries are handled. These are grouped, as shown by the map, Fig. 1, and to these the meat is hauled in the early morning. For those at a considerable distance the railway is used, for nearer ones motor trucks, for those still nearer horse trucks do the hauling. Since the big packers can ship a refrigerator carload to Evanston, for instance, 15 miles out, for $7 and have the meat get there in good order, they are not figuring on trucks for that service. They deliver in lots big enough so that they can ship a car at profit.

The smaller packers, however, who do not ship in quantities to near points, seeing the opportunity, are using commercial cars, some of them of the larger tonnage, to compete with the shippers of carload lots, delivering smaller lots in quicker time and with a good margin of profit. In this work the truck has opportunity to show what it can do.

There are thus two general and important classes of delivery worth looking into, each having its own advantages and disadvantages; first, the city delivery of the big packers to the wholesale markets, and, second, the delivery of the smaller firms and wholesale markets to the retailers. Trips made in each class of work will show just what problems are met and how they are being coped with.

The following is an example of downtown delivery from the Union Stock Yards:

TRIP No. 1.

Swift & Co. truck delivering to Irwin Bros., wholesale meats, 809 S. State street.

Truck arrived at the delivery platform of the city market at 1:00 p. m. Was loaded by hand truck from platform. Overhead trolley used for heavy beef, etc.
Loading time.. 45 minutes

After the load was on the driver had to wait for his delivery slips. These had to go through three hands for listing, checking and approval, taking.............. 15 minutes

There is often a wait of an hour for slips, showing a fault in the checking system.
Truck left at.. 2:08

Road winding, rough cobble-stone, badly kept.
Arrive at Yard entrance, 35th and Center.............. 2:19

Turn East on 35th. Truck speeds up with motor turning over at 1800 R. P. M. On questioning it was found that the truck was fitted with a governor but it was out of order, and since the driver did not like it connected, it had not been fixed. Could not learn whether the governor was purposely out of order or not. Speed of truck too great for economy on such streets.

Turn North on Wallace. Cobble pavement, East on 29th. North on Canal. Cobble. Turn North—East on Archer. Cobble. Turn North on State. Pavement worse. Rough and full of holes. At No. 1837 State, Morris & Co. truck, loaded with hides, stopped with front tire stripped of. Not worn out but stripped from rim through bad surface and overloading.
Arrive at Irwin Bros., No. 809 S. State................ 2:40
Time of run.. 32 minutes

At the receiving platform 10 wagons or trucks were loading and unloading. Two men were furnished by Irwin Bros. to do the work. Each machine or wagon arriving waits its turn. There was no preference given to motor vehicles.

Armour motor truck arrives	3:04
Swift truck starts to unload at	3:05

Men take their time, stop to tell stories and crack jokes. No hurry anywhere. Drivers help load to tail-board then stand idle until hand truck is back.

Swift truck unloaded at	3:20
Receipt for load obtained at	3:38
Only one-half the load was left here. Away at	3:40

Summarizing this receiving of the half load, the figures are as follows:

Unloading time	15 minutes
Idle time due to system	45 minutes
Total idle time	1 hour

From Irwin Bros. the truck proceeded to Magner, Winslow & Co., No. 442 Clark taking 6 minutes for the trip. This firm uses three trucks in retail meat delivery to hotels, etc.

Arrive Magner, Winslow & Co	3:46
Start unloading at	4:00
Empty at	4:12
Checked out at	4:28
Leave at	4:30

Unloading time, one-half load	12 minutes
Idle time due to system	32 minutes
Total idle time, one-half load	44 minutes
Run back to Stock Yards	32 minutes

There are a number of interesting points brought out in this trip, as shown by the summary following:

Item	Time	Per Ct.
Total running time of truck	1 hour 10 minutes	29.9
Total unloading time	27 minutes	11.6
Idle time due to checking systems, etc.	1 hour 17 minutes	31.8
Total idle time	1 hour 44 minutes	43.0
Loading time	1 hour 8 minutes	29.1
Total time of run, including loading and unloading	4 hours 2 minutes	

A horse truck with the same load and at an investment cost of about $1000 could make the same trip in five hours, allowing one hour for the three-mile trip each way and equal receiving, loading and checking facilities. If trucks are to pay in delivering at this point they will have to make a better showing than this. If properly handled they could do twice the work they are doing now.

With present facilities at the yards the load can be put on the truck in 15 minutes. With proper checking facilities the driver could get his clearance slips five minutes later, making 20 minutes for his loading time and getting away.

With a good road to the city the run could be made in 32 minutes as an easy average without straining the truck or its tires. Arrived at the unloading platform with the driver and helper working (no helper is carried at present) and the men from the receiving firm disposing of the meat in the refrigerators as fast as delivered the entire load could be gotten off in 15 minutes and the receipt be in the driver's hands not more than five minutes later, letting him off for the 32-minute run back.

Necessary Changes in Receiving Platforms

This would necessitate some changes in the present method at the receiving platforms. Trucks and wagons now take turns, and it is entirely a question of first come first served. With quick delivery, trucks would be run on schedule, packers taking their turns or making engagements ahead by telephone. The day will come when each firm operating the motor trucks to any extent will have a dispatcher to handle the movement and schedule of trucks as a train dispatcher handles a railway, and whose business it will be to see that trucks are kept moving and not hung up on sidings. This will not be necessary in the case we are dealing with, however, for some time. On account of the rushed service a helper will be necessary on each truck.

Consider for a moment just what this would mean to the packers delivering only to this one point listed in our example, and there are many more receiving points with the same conditions. Here would be a sample trip:

Item	Time	Per Ct.
Loading time	15 minutes	
Checking	5 minutes	
Total	20 minutes	19.2
Running to town	32 minutes	30.8
Unloading	15 minutes	14.4
Receipt in	5 minutes	4.8
Return to yards in	32 minutes	30.8
Total time of trip with loading and unloading	1 hour 44 minutes	

With proper handling and straight loads it is easily seen that each truck could make two deliveries where it is now making but one. To prove that the conditions of the single trip were not abnormal, check was taken on trucks arriving at Irwin Bros.' receiving platform on the morning of April 8.

Motor Trucks and the Packing Industry
Digest of Part I.

POOR receiving conditions in the downtown districts of Chicago are costing the packers of the Union Stock yards over $40,000 a year in lost motor truck service.

NEARLY 15 per cent. of the motor trucks used in Chicago are operating in the meat industries of the city connected with the stock yards.

SIXTY of these trucks operate out of the mile square area of the Union Stock yards.

OVER 2000 tons of meat are hauled to the City of Chicago and environs by team or motor truck every working day of the year.

IN the operation of motor trucks out of the yards over poor cobble pavements the driver proposition is the most important problem with which the packers have to cope at present.

IT is the driver problem that is causing them to lean toward the electric delivery vehicle for city work.

MUCH of the waste and lack of efficiency on the part of many of the trucks now operating is due to a general misunderstanding and lack of study of truck operation on the part of owners, drivers and receivers of goods. A little cooperation between these three factors of the delivery system would lead to greatly increased service and greater efficiency all around.

TWO HUNDRED motor trucks operating efficiently could more than equal the work now being done by 450 teams working out of the yards at a saving of 1.4 miles of street room to the City of Chicago.

RETAIL meat men of Chicago using motor trucks in their own delivery work realize the importance of eliminating delays in their own truck service but do not extend the same knowledge to benefit those delivering to their platforms.

CHICAGO packers are planning for a more extensive use of motor trucks in the yards and need machines which will meet conditions found in few other places. Speeds must be moderate, the machines as nearly foolproof as possible, wheels over-tired if anything, springs extra flexible and efficient, motor powerful and not of too high speed, power plant and gearset well protected from the excessive road vibration, truck capable of a high percentage of overload without injury; and many other points.

Swift truck No. 265 arrived at	5:37 a. m.
Swift truck No. 275 arrived at	5:45 a. m.
These trucks left the yards at 5:00 a. m., having been loaded before the drivers arrived.	
Armour truck arrived at	6:09 a. m.
At 6:30 there were 10 wagons and trucks waiting in line for loading and unloading, two men working.	
Swift No. 265 started unloading at	6:58 a. m.
Unloaded at	7:30 a. m.
Left at	8:10 a. m.
Truck No. 265 idle for 2 hours and 33 minutes.	
Swift No. 275 starts unloading at	7:20 a. m.
Unloaded at	8:15 a. m.
Left at	8:20 a. m.
Truck No. 275 idle for 2 hours and 35 minutes.	
Armour truck starts unloading at	8:16 a. m.
Unloaded at	9:02 a. m
Left at	9:14 a. m.
Armour truck idle for 3 hours and 14 minutes.	
Total loss of three trucks for one morning, 8 hours 22 minutes.	

At the former figure of 1 hour 44 minutes for a rational trip this means that this morning delay alone shows a loss of nearly five truck trips from the yards to the city, an average of 2 hours and 47 minutes a trip lost to each truck. These trucks make two trips a day to this point.

Determining the Average Trip

With these figures as a basis it is easy to determine an average trip under present conditions where the load is all discharged at one point such as this. A large percentage of the loads for this point are left entire, so the condition is typical. The idea is to find the average time at present required for a motor truck to make a round trip to this platform with the delays involved so that this may be compared with the figures as to what may be done:

The time allowed for loading at the packing house platforms is 1 hour. The load is actually on in many cases in 15 minutes, but often the man will wait an hour for his slips and clearance before he can leave, even after the loading time is up. Of three drivers checked at a packing house platform

Driver A waited for his slips	15 minutes
Driver B waited for his slips	15 minutes
Driver C waited for his slips	18 minutes
Average delay for slips	16 minutes

This figure is really low, as in rush hours 30 minutes is common. However, taking this figure as typical, and one hour for loading, the rest is as follows:

Loading platform delay	1 hour	16 minutes
Run to city		32 minutes
Stop at receiving platform (as figured)	2 hours	47 minutes
Return to Yards		32 minutes
Total time for round trip	4 hours	27 minutes

On questioning at the yards it was found that this was close to the actual figures for each truck trip to the city, and a fair average under present conditions. Taking the former figure of 1 hour and 44 minutes as a possible figure for the trip it can be seen that it would be possible for each truck now operating in the city district to do the work of 2.57 trucks as working under present conditions, or say 2.5 trucks in even figures. Thus each truck in actual service rendered would save all the cost, upkeep, driver expense, etc., of 1.5 trucks. Taking this with driver's wages and all attending expenses at the broad figure of $10 a day as an average for machines of this tonnage, each truck would save $4650 in 310 working days. The four trucks now operating to Irwin Bros. from the different houses thus would save to the packing houses $18,600 a year, while the average of nine trucks operating to Chicago's center in the meat business would save $41,850 to the stock yards industries annually.

In taking the basis of 310 days on these figures it is understood that a truck would not operate for that number of days in the year, but if that particular machine were not working some reserve machine would be, whose loss would be in the same proportion, so that the figures hold for 310 days.

In the same line of inadequate unloading arrangements time was taken on the unloading of a meat truck at the store of Froehling & Heppe, wholesale meat dealers on State street near Lake, on April 12.

A Swift 3.5-ton motor truck arrived at the sidewalk at 5:45 in the morning. The store did not open until 6:30, but since the first machine there is unloaded first it is deemed advisable to arrive early to hold the position.

No start was made toward unloading this machine until 7:05. One man was detailed to the load from the receiving firm and to him the driver handed the meat over the tail-gate of the truck. When the hand truck on the sidewalk was loaded the driver helped push it up the grade of the walk to the paved alleyway leading to the rear, but the unloading in the store, after it was checked in and weighed, was left entirely to the one man for the receiver, the driver standing idle meanwhile. These trips took from four to 20 minutes each, depending on the load. Loins or ribs take longer to hang inside, so that when these are unloaded the hand truck is gone 20 minutes at a time while the driver stands idle.

The load was off at 8:05 and the receipt in the driver's hands 4 minutes later, so that the driver was away for the yards at 8:12.

Here was a dead stop of 2 hours and 27 minutes, the only difference between this and the former cases being in the time required to get the receipt for the load. While 3 minutes was spent waiting here, it took 18 minutes in a former case at Irwin Bros. and 16 minutes at Magner Winslow & Co. to get receipt for load in order to clear away.

On some occasions, according to the driver, this Swift truck has waited at the State street store mentioned until 10.30 before being unloaded. There was no fault found with the checking system, however.

The railway yards are as great offenders in their line as are the local depot men, for at the out freight stations a wait of 2 or 3 hours is common. A wait of an hour on the part of one truck on the morning of April 11 was unusually short.

Department stores are also slow in receiving goods. On a recent trip a truck from Armour's was sent out with a load and was expected back at noon for the replacement of a small part in repair. It did not show up until 5:30 at night, the difference in time being due to the slow reception of goods. In using trucks themselves the department stores have found the value of saving every moment of time, but this knowledge has not yet percolated from the shipping rooms to the receiving rooms to a great enough degree to influence the reception of incoming goods from motor trucks. All of this hinders efficiency in the machine, and costs the user, producer and finally the consumer just that much more. It is by eliminating the wastes between producer and consumer that prices will be lowered, if at all, and the cost of living reduced.

A peculiar source of delay is prevalent on the West Side in Chicago on Saturdays, where there is considerable Jewish trade. About 40 per cent. of the West Side trade of one packing house is in "kosher" meat for the Jews, killed for them by a rabbi at the stock yards and bearing his mark. Since Saturday is the sabbath for the Jews they refuse to handle meat on that day or do any work. Some will not even handle the money on that date, but direct the driver where to find it. Drivers, therefore, on Saturday, if they would deliver meat to these small shops at all, must unload it themselves and store it away in the refrigerators. Many times it happens that the customer is at church and some of the drivers, knowing conditions and their customers as well, do not hesitate to drive to the synagogue and ask for their customer, who comes out to open the shop and receipts for the load, but will not touch the meat.

A Typical Meat Delivery Schedule

A typical trip touching a part of this district was made by a truck for Swift & Co. on April 5, covering 5 miles in 3 hours and 37 minutes, making seven stops, these averaging 15 minutes each.

At the first, 4 minutes were consumed waiting for room to back to the sidewalk. One man unloaded with a hand truck. This when filled was wheeled onto an elevator and disappeared. The driver waited for the elevator 20 minutes, while his unloading took only 12 minutes. Total time for the stop, 37 minutes. Four minutes were lost in waiting for the receipt, and when this came the clerk threw it out of a second story window, unweighted in a gale of wind and let the driver chase it. When recovered from under the truck it was slightly the worse for wear.

At the next stop 20 calves were unloaded in 27 minutes, the driver doing all the work. Thirty-seven per cent of the time on this trip was spent in unloading, and there were only eight stops. A map of this trip is shown in Fig. 3. At the left the stops are shown in squares with the number of minutes occupied in the stop marked in them.

The other trip, shown with the stops marked in circles, was made on a truck run by Irwin Bros. from their main store to the south side branch and for retail delivery work to hotels, hospitals, etc., etc.

This truck is of 2-ton capacity, and on the trip mentioned made but four stops, aggregating 47 minutes, the actual running time being 57 minutes. The streets on this route were for the most part excellent.

The truck left Irwin Bros. at	9:07
Arrived at Union Cold Storage Co., 16th, near Dearborn, at	9:12
Here an order was left for goods to be called for on return to save time in waiting. Stop	3 minutes
Off at	9:15
Arrived Lakota Hotel, 30th and Michigan	9:21
Three packages left. Time of unloading	5 minutes
Left at	9:26
Arrived at 58th and State	9:43
Time of out run	27 minutes
Unloaded 1.5-ton load, two men, in	8 minutes
Wasted	8 minutes
Left at	9:59
Arrived at Union Cold Storage Co	10:23
Loading time, 2.5 tons or over	20 minutes
Away at	10:45
Big overload on. Body clears rear wheels on one side by ⅞ inch, on the other by ⅝ inch. On every bump, though driver goes slowly after smelling burning rubber, the tires and body scraped. Smoke shot out from under body and smell of rubber was strong. Effect visible on tires when truck arrived at	10:50

After the return the truck was not due to leave until 2 in the afternoon. Sometimes short runs to loop hotels are made to fill in, but not when it can be helped, as alley congestion is too great and once in it is hard to get out. This truck, however, in service from 7 in the morning to 6 at night, is doing the work of three teams. An average of 9000 pounds a day is carried, with a mileage of 40-65 miles. Trips to Hyde Park, a distance of 9 miles, are made between 2 and 5 in the afternoon. Trips to Dunning are made twice a week, about 11 miles, besides the regular delivery.

The Big Retail Field

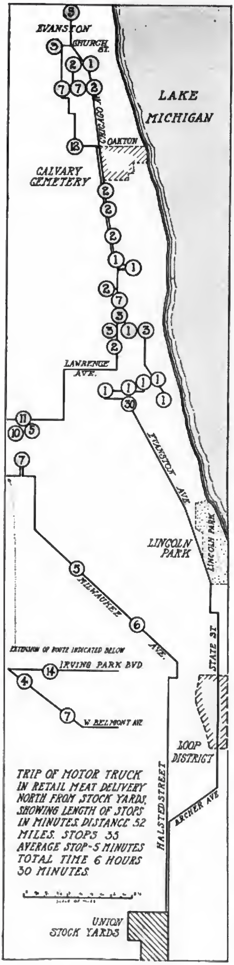
The most fitting use of motor trucks by the packers themselves is in the line of retail delivery of the smaller firms who deliver to more or less distant points in less than carload lots. It is these who are making trucks pay, for the hauls are long, with reliable drivers the stops are short, and many things in favor of truck operation as against horse use. The truck running in this service for Louis Pfaelzer & Sons is making from 45 to 60 miles a day, carrying 6 tons and making from 25 to 45 stops a trip.

A run like this shows what a truck can do in daily service, and this work has been kept up, rain and shine, with few exceptions. An actual trip made the morning of April 3 is worth giving in detail. In following it it is well to remember that the two men on the truck were hustlers in every sense of the word, and kept the truck at its best during the whole run as against the average driver who has no interest in his run or car. The helper, especially, had ginger enough to outlast three ordinary helpers, and left no idle moment for the driver, with just enough exception to prove the rule. Men will get thirsty.

Stop	Location	Hour	Idle Time
	Arrive Union Stock Yards	4:30	
	Loading		1 hour
	Leave at	5:30	
(1)	Arrive at Clark and Montrose	6:30	
	Store not yet open. Wait		30 minutes
	Leave at	7:00	
(2)	Ravenswood		1 minute
(3)	Clark and Sunnyside Streets		1 minute
(4)	Wilson and Racine avenues		1 minute
(5)	Evanston and Montrose avenues		1 minute
(6)	Evanston and Wilson avenues	7:10	1 minute
	As the day advances men are busier and time of unloading is longer.		
(7)	Evanston and Balmoral	7:13	3 minutes
	West on Balmoral, South on Clark to		
(8)	No. 5304 Clark street	7:17	1 minute
	North on Clark to		
(9)	Clark and Bryn Mawr	7:20	3 minutes
(10)	Clark and Edgewater	7:29	7 minutes
(11)	East to No. 2449 Devon	7:35	1 minute
(12)	Clark and Devon	7:37	1 minute
(13)	Clark and Farwell	7:43	2 minutes
(14)	No. 6963 Clark		2 minutes
(15)	No. 6974 Clark		2 minutes
(16)	No. 911 Chicago avenue, Evanston	7:55	2 minutes
(17)	No. 913 Chicago avenue		1 minute
(18)	83d and elevated		2 minutes
(19)	No. 700 Main Street		7 minutes
(20)	No. 709 Main street		7 minutes
	Extra time through weighing out meat delivered.		
(21)	Maple and Foster streets	8:20	5 minutes
(22)	Maple and Davis streets	8:30	3 minutes
(23)	Third and Oakton	8:38	12 minutes
(24)	Ridge and Peterson avenues	8:57	2 minutes
	Stop for drink	9:00	7 minutes
(25)	Ashland and Balmoral	9:17	3 minutes
(26)	Ashland and Foster	9:22	2 minutes
	Run West on Lawrence to Western avenue; South on Western to Irving Park boulevard. Good paving until now. The boulevard a series of cobble-rimmed holes and lakes of mud. Bad on tires and springs.		
(27)	Irving Park and Sacramento	9:40	11 minutes
(28)	Whipple and Byron streets	9:53	5 minutes
(29)	Grace and Whipple	10:00	10 minutes
(30)	No. 3609 Irving Park boulevard (drink)	10:18	14 minutes
(31)	No. 4810 Milwaukee avenue	10:47	4 minutes
(32)	No. 3874 Milwaukee avenue	11:05	7 minutes
(33)	No. 3355 Sacramento avenue and Roscoe	11:27	7 minutes
(34)	No. 2202 Milwaukee avenue	11:45	5 minutes
(35)	No. 939 Milwaukee avenue	12:00 M.	6 minutes

Load off. Stop for another drink. Observer takes street car to city. Odometer reading to this point 35 miles from yards, is 52 miles; 55-mile run in all, inclusive. It is easy to see that this truck in actual operation is doing the work of from three to five teams, depending on the weather and road conditions, and is a great adjunct to the business of this particular firm. With loafing driver and helper the truck would not have accomplished this amount of work, which only emphasizes the importance of the driver problem.

A large part of this loafing on the part of the drivers is not entirely their fault. They are all graduates from the ranks of the teamsters, and being used to no hustling on the horse work, see no reason why they should hurry faster with motor vehicles. To them the truck merely takes the place of the team they drove formerly, and if with it they do twice the delivery work of meat in a day that they did with horses they feel they are working too hard for their money and slow down. Even then the



TRIP OF MOTOR TRUCK IN RETAIL MEAT DELIVERY NORTH FROM STOCK YARDS, SHOWING LENGTH OF STOPS IN MINUTES. DISTANCE 52 MILES. STOPS 35 AVERAGE STOP-5 MINUTES TOTAL TIME 6 HOURS 30 MINUTES.

truck forces a little more unloading than formerly, so that there is a clamor for helpers. Possibly helpers on the trucks who would help the receivers in unloading would be an advantage; at any rate, something must be done to speed up the service given to the trucks, at least downtown. Where there is no waiting in line a hustling driver or helper can make things move faster, but where there is a waiting list there is nothing they seem able to do. The driver problem in Chicago is of utmost importance. Indeed, some of the packers place the driver problem and attending evils as the chief reason for the failure of trucks to make a better showing in the run to the city, and there may be a certain truth to this. Good men are hard to get, and a poor driver, under the labor conditions, once hired, is hard to get rid of in order to get a better man. Being in all cases teamsters educated to operate the trucks, they have a joy in speed in a large measure, and this, together with bad road surfaces, makes for an unnecessarily large percentage of upkeep expense.

Poor Repair Work Causes Extra Cost and Trouble

Again, on these roads springs good in other localities are prone to snap, leading to the practice of adding leaves to the springs on replacement. This saves breakage of springs, but leads to many other mechanical troubles due largely to the excessive vibration. If drivers were more careful and reliable, say the packers, these things would not be.

That there is something to this is evidenced by the trip made on Swift & Co.'s truck to the city. The run of 3 miles, as stated, was made in 32 minutes. The truck originally had a governor fitted, but this was not working at the time of the trip. For the greater part of the run with a 3.5-ton load and over these rough cobble pavements, ranging from bad on Archer avenue to worse on State street, where thicker traffic had done greater damage, the motor was turning over at 1800 a minute. On a later visit this truck was in the repair shop. On being questioned regarding the governor the driver said he didn't like it and thus it was not allowed to work.

The road trouble is not all the trouble with the drivers for there is a tendency on the part of many to loaf on the job. It was one of these who stood in front of a local wholesale market one morning recently and told a group of drivers about the working of a check machine which had been put on some of the wagons, and which it was expected would be applied to trucks later. With loud voice he proclaimed that if such a device were ever put on his truck he'd soldier all he could. If the firm couldn't trust him to go about his business and do no loafing without putting a machine on to watch him he would do various things. As he talked it was noticed that his motor truck stood idle 40 minutes after it was unloaded and ready for him, while he discoursed on how he *would* loaf if the device were put on. He could not see that the device was to check the machine itself and the firms he was delivering to, more than to spy on his work.

The Labor Problem and Schedule of Wages Paid

There are many good drivers taking motor trucks out of the yards, but the labor problem itself is in a large measure responsible for the leaning which packers show toward electric trucks for the future in their city hauling, if their word on the matter can be taken seriously, as it undoubtedly can.

The schedule of wages paid to drivers in the yards is as follows:

Cart drivers	20	cents an hour
1-horse drivers	22	cents an hour
2-horse drivers	24½	cents an hour
3-horse drivers	27	cents an hour
4-horse drivers	29½	cents an hour
6-horse drivers	32	cents an hour
Motor Trucks, Gasoline.		
1 to 3 ton	25	cents an hour
3 tons and over	30	cents an hour
Motor Trucks, Electric.		
Under 2 tons	22	cents an hour
2 to 4 tons	25	cents an hour
Over 4 tons	30	cents an hour
All helpers on motor trucks	24½	cents an hour

Drivers help in the loading and unloading of the machines, but not carrying in downtown. Helpers are furnished only on the big cars and longer hauls. Drivers must be responsible enough to handle money on C.O.D. orders, as the loads they carry sometimes are worth as high as $4000. Few run under $1500. The driver and his development has a great deal to do with the future use of trucks in the stock yards.

The general attitude of the packers toward motor trucks is favorable. They realize that there is a development period ahead in fitting things to truck use but take it as a step in the march of progress and through competition have to take up trucks whether they will or no. Gasoline trucks by far outnumber others, and yet, through the performance of the newer electric trucks of lighter tonnage there is a distinct feeling among the delivery superintendents toward giving this type of car a more thorough tryout than has been done.

Driver a Very Big Influence

The manager of one packing company was very emphatic on his experience:

"We have found that 75 per cent. of success or failure with gasoline trucks is due to the driver. If he is good, the truck is good, and if he is careless, the truck can't make good. You can overspeed a gasoline motor and if you add a governor you only add machinery. Owing to roads, receiving conditions and traffic conditions downtown our trucks in operation averaged just 2.6 miles an hour in the month of March. One car was held in the garage 3 months waiting for a new crankcase and when it came, made up special, it didn't fit. Another was held up 2 months in the barn for the lack of two small parts in the steering gear."

There might be some fault in the garage of this concern, that is being blamed on the trucks, a lack of proper handling of repairs and upkeep and a lack of system. When the statement was made by the garage man later that a car should be scrapped at the end of 3 or 4 years and a new one bought rather than try to keep up repairs on the old one, there was more doubt. When it was later learned that three extra leaves had been put in the rear springs of each car there was a reason seen for increased upkeep and short life of cars—but the cars get the blame. At any rate the packers are looking toward electrics for city work.

"We can overload an electric motor," said one, "and not hurt it but you cán't a gasoline. We can get batteries guaranteed for 4 years and at the end of that time the makers will take them back as 50 per cent. payment toward new ones. Thus we know just what our power will cost us." Here is a case for someone to argue.

Packers Like Electric Trucks

"The driver problem is solved with the electric," said another, "for we can get men at teamsters' wages and they can't abuse the car. It is more foolproof than the gasoline and more easily handled by an unskilled man. We are going to use some the coming season and see."

So much for sentiment. At the same time for the longer hauls and work to depots the gasoline truck is far in the lead in point of numbers in the yards and bids fair to keep its advantage.

It is an open secret about the yards that Swift & Co. are planning to build their own gasoline trucks. Draughtsmen are at work on the car, and a three-story factory building is being planned back of the present garage.

The average truck in the yards makes from 30 to 35 miles a day making from one to 20 stops with a 3-ton load. Horses in the same work make an average of 17 miles with a 3-ton load and from 5 to 20 stops. The chief difference then is in the mileage covered which gives the truck an advantage of 17 miles a day. Horses average not more than 285 working days during a year.

Tires last about 8000 miles for rears and 10,000 miles in front. With electrics 2000 miles more is obtained. Block tires are universal for rear wheels in the yards, continuous tires in front.

On trips to the loop district nearly one-half of the trucks for the big packers return with a load, this consisting of butter, eggs, poultry or the like.

Summing up the whole situation again, conditions are as follows:

Downtown delivery of meats under present conditions is impossible by motor trucks as a financial proposition, but these conditions for the most part can be easily remedied.

The driver problem in the yards is one of the greatest factors toward hindering the use of more motor trucks.

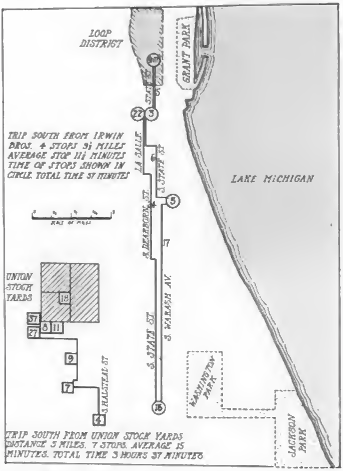

LOOP DISTRICT
GRANT PARK
STATE ST
5
22
3
TRIP SOUTH FROM IRWIN BROS. 4 STOPS 9½ MILES AVERAGE STOP 11¼ MINUTES TIME OF STOPS SHOWN IN CIRCLE TOTAL TIME 57 MINUTES
LA SALLE
6
S. STATE ST
5
S. DEARBORN ST.
4
LAKE MICHIGAN
17
UNION STOCK YARDS
18
37
8
11
27
S. WABASH AV.
S. STATE ST
9
7
S. HALSTEAD ST
4
15
WASHINGTON PARK
JACKSON PARK
TRIP SOUTH FROM UNION STOCK YARDS DISTANCE 5 MILES. 7 STOPS. AVERAGE 15 MINUTES. TOTAL TIME 3 HOURS 37 MINUTES

Fig. 3—Map Indicating a Day's Work of One Packer's Truck in the Southern Part of Chicago, with Time of Each Stop Indicated

Lack of understanding of the truck as a transportation unit is evident on the part of drivers, truck owners and receiving markets, and is largely responsible for the present delays.

Owners are expecting motor trucks to handle twice the meat of a horse vehicle with only the same amount of help in loading and unloading.

Drivers feel imposed upon if called on to work any harder on a motor truck than they did on horse vehicles though their pay is more.

For long hauls where a helper does the meat work and a chauffeur drives the car, much idle time is eliminated at unloading points. The so-called helper in this case acts as the conductor of the car, the driver as the motorman.

Commercial Vehicle Tires in England

Mileages With Peter Union Tires on the 'Buses in London in Daily Service—Sold on 10,000-Mile Guarantee But Give 30,000 Miles in Actual Service—Some Dunlop Mileage Figures—Part II

By Arthur E. A. M. Turner

LONDON, April 10—In following up still further the question of mileage obtained from solid rubber tires, the performance of the Peter Union tire which is supplied by contract to more than 700 of the London 'buses, furnishes a typical example. The tire price is not known definitely, but it is generally accepted to be approximately 3 cents a mile. The mileage of these tires varies, the highest touching 42,000, and the lowest 24,000. In a report of the mileage of these tires, supplied by the London General Omnibus Company, the following mileages were obtained:

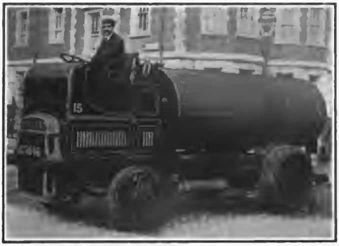


Fig. 7—Westminster Sprinkling Cart on Peter Union Tires. Note How the Fronts Have Worn Flat While the Rears Still Hold Their Rounded Form. English Designers Ascribe This to the Design In Which the Driver is Placed Above the Motor

Mileages of Motor Buses

Miles.	Miles.	Miles.	Miles.
34,608	38,930	29,986	33,585
28.752	30,168	28,929	32,348
26.591	27,036	30.027	33,735
38,933	28,772	35.679	33,486
30,745	35.024	29,767	29,471
36,997	36,294	29,767	30,911
33,063	33.530	31,101	31,268
35,008	41.895	29,064	29,064
33,072	33.926	32,341	31,331
34,205	35,635	42,670	30,072
32,778	27,228	38,502	30,072
26,081	37,638	28,264	
35,005	26,946	33,332	

Total for 50 tires...1,613,502
Average for 50 tires.. 32.270

The Peter Union tire is used largely by railroad companies, by municipal authorities and industrial concerns, and generally gives satisfactory results. Many examples of this can be given: In one case, on a 5-ton vehicle after a mileage of 21,636, the tires were running in good shape, though a little worn.

Taking the price of the average 100 to 120 millimeter solid tire as ranging from $500 to $600 a set, it will be seen that over such big mileages tire costs are extremely low. On 1.25-ton vehicles these tires have run at a cost of 1.5 cents a mile, when purchased outright. The cost of these tires varies upward to 4 cents a mile for a 5-ton vehicle on contract, or more if bought outright, the cost varying in respect to how the vehicle is driven, overloaded or the like.

In Fig. 7 some of these tires are illustrated. They are regularly sold at a guarantee of 10,000 miles, the principal stipulation of which is that this mileage must be made within one year from the date of purchase.

This depicts a Leyland watering cart on a 5-ton chassis and shows how the front tires have worn flat with the rears still holding their original round form. In this country, this is held to be the fault of the driver-over-the-motor design. Referring back to Fig. 7, which shows the Peter Union tires, this particular set had done over 35,000 miles when the photograph was taken and subsequently increased this to more than 40,000 before they gave out.

As will be seen in the sectional drawing, Fig. 8, this tire is composed of a harder base or ebonite as it is often called, on a metal band which holds the shape of the whole. On this comes a middle section of rubber which is neither hard nor soft. Just as the harder rubber is vulcanized to the metal base so the softer material is joined positively to the harder part. Finally, the tread portion is of soft, plastic rubber which will yield to road inequalities. This is joined to the harder and less yielding middle portion by heat treatment with sulphur.

Another make of solid rubber tire is the Dunlop used for vehicles up to 2 tons capacity. Its big seller is the band section tire which has been on the market for the past 4 years. Like

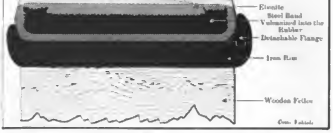


Fig. 8—Sectional Drawing Showing Construction of Peter Union, a Well-Known English Solid Tire. In This a Steel Band, with Serrated Edges, Is Vulcanized Into the Hard Rubber Base Marked Ebonite and the Flexible Portion of the Tire Is Vulcanized to This. The Hard Rubber or Ebonite Base Rests on Steel Rim

the Peter Union this has a metal band to which the hard base is vulcanized, the central and upper sections, of medium and soft rubber respectively, being joined to this by proper heat treating. Fig. 9 shows the cross sectional construction of this, while in Fig 10 may be seen an instructive view of a set of these in actual service.

The method of attaching the Dunlop is shown in the illustrations while the table below gives the permissible loads:

Permissible Loads on Dunlop Tires

Tire Size		Maximum Gross Load Each Axle Single Tires		Dual Tires		Total Load on 6 Tires		Total Load on 4 Tires	
mm.	in.	cwt.	lbs.	cwt.	lbs.	cwt.	lbs.	cwt.	lbs.
50	1.97	12.5	1,400	25	2,800	37.5	4,130	25	2,800
65	2.56	17.5	1,960	35	3,920	52.5	5,870	35	3,920
75	2.95	24.0	2,688	48	5,376	72.0	8,064	48	5,376
85	3.35	30.0	3,360	60	6,720	90.0	10,080	60	6.720
90	3.54	35.0	3,920	70	7,840	105.0	11,760	70	7,840
100	3.95	42.5	4,760	85	9,520	127.0	14,280	85	9,520
120	4.72	55.0	6,160	110	12,320	165.0	18,480	110	12,320
140	5.51	70.0	7,840	140	15,680	210.0	23,520	140	15,680
160	6.30	85.0	9,520	170	19,040	255.0	28,560	170	19,040

This tabulation is self-explanatory in that column 1 shows the tire sizes in millimeters and inches; column 2 shows the maximum axle load for a set of single tires; column 3 shows the maximum axle load for a set of twin tires; in column 4 is the total gross load on a set of 6 tires, twin sizes on the rear; and in the last column is the total gross load on a set of four tires, in which singles are used in the rear.

Too much stress cannot be laid upon using tires of large section. The sections quoted against various loads are the smallest that should be used for such loads. Where roads are bad or hilly a considerably greater mileage can be secured, and vibration reduced, by fitting slightly larger section tires.

The running costs under different loads approximate to the figures given in the table at the conclusion of the first instalment.

In industrial service the writer has been informed that firms like Whiteleys have got up to 22,000 miles from Dunlop solid rubbers on 1.5-ton gasoline wagons. Dunlops, however, made their real solid tire "splash" with some 100 millimeters turn solids which they supplied to the Metropolitan Motor Bus Company, Ltd., the tire on the wheel illustrated in Fig. 10, having done 35,803 miles, and after being put back on the 'bus, it ran to 40,508 miles before it was thought advisable to remove it. It commenced service on March 7, 1909 and ended on April 11, 1911. These Dunlop band solids have done well in Buenos Aires, Rio de Janeiro, etc. All Dunlop solids are guaranteed for 10,000 miles with the proviso about it being run within 1 year.

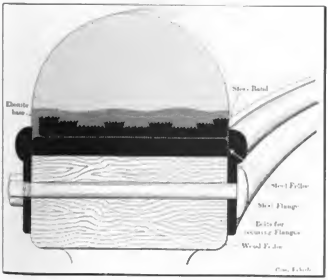


Fig. 9—Sectional Drawing of the Dunlop Solid Band Type of Tire, Showing Constructional Details. This Tire Has a Steel Band with Serrated Outer Face Vulcanized Into the Hard Rubber Base. The Flexible Rubber Part Is Vulcanized to the Hard Base. A Demountable Form Is Shown

In the table at the bottom of this page may be seen some additional and instructive mileage figures. These have been taken mainly from tires which have not yet served their usefulness, that is the mileages given represent but a part of the total which will be derived from the tires. Practically all those cases cited are of tires on motor 'buses in service in the city of London. The reason for this lies in the fact that the 'bus companies are more careful in their purchases, since their annual totals are so much higher than those of private users.

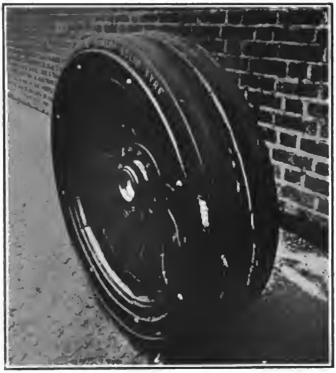


Fig. 10—Dunlop Tire from Metropolitan 'Bus. This Reproduction Is from a Photograph Taken When the Tire Had a Record of 35,803 Miles. Later the Wheel Was Replaced and the Tire Did 5000 Miles More Before Giving Out and Requiring Replacement.

Some English Tire Mileages

Make	Mileage	Remarks
Dunlop	31,951	4 and 5 ton truck
"	31,951	" " "
"	32,036	" " "
"	32,036	3 and 4 ton truck
"	33,148	" " "
"	33,148	" " "
"	37,847	2 and 3 ton vehicle
"	37,847	" " "
"	38,616	" " "
"	38,616	" " "
"	40,508	" " "
"	40,508	" " "

Totals for the 12, 428,212
Average for the 12— 35,684.4

117 rear tires ran 2,220,088, average 18,975—On Tilling Omnibuses
57 front tires ran 871,378, average 15,278—On Tilling Omnibuses
Continental—size 1010 by 120 (39.4 by 4.72) rears
Continental—size 770 by 100 (30.3 by 3.94) fronts

Fronts (Polack) did 21,640 miles on 2-ton van and still running.
Dual rears (Polack) did 18,518 miles on same car and still running

Following Dunlops are still running:

Seven with a record of	31,000	miles
Six with a record of	32,000	"
Two with record of	35,000	"
Two with record of	36,000	"
Two with record of	39,000	"

Making 19 with records greater than 31,000 miles
Making a grand total, lumping the various makes, of 4,207,254 for 208 tires, an average of 20,227.1 miles a tire with 22 of them still running.

The Trend of the Times in Truck Work

Intensifying Sales By a General Survey of Similar Industries, An Analysis of Methods Used in Marketing Their Product and the Adoption of These to the Merchandising of Commercial Vehicles

Part IV—Some Pre-Requisites of Salesmanship

WHEN we consider the enormous capital invested in the automobile industry and its position today in the world of commerce we begin to wonder how long it will be before that division of this great industry responsible for merchandising its product in motor trucks will remain unaided by that administrative genius which has brought forth such prodigious development in the financial and manufacturing branches of the art.

The world has been astonished at the wonderful efficiency and automatic precision with which the machines of the pleasure vehicle type have been turned out at the rate of hundreds a day, and still more surprised at the avidity with which the populace has absorbed them. A few decades ago the account of such performances would have been ridiculed as the grotesque imaginings of one unsophisticated in the ways of common sense business. However, the fact remains to prove how limited we are in our provision and how rooted to our established methods of thought.

May we not also say that we are at the beginning of a similar cycle in the matter of motor truck development, and are we not confronted with the same mental indolence both within the circle of the industry and among those who will absorb its product eventually? This mental impediment is the greatest frictional resistance we have to contend with in the acceleration of our progress and the development and application of an efficient lubricant is the function of the present article.

New conditions surrounding our operation in any field of human activity, whether social, political or industrial, and which are the result of our progressive development in communal intercourse and co-operation, demand and eventually force upon us new or altered modes of action. Sometimes the demand is acceded to voluntarily by the more enlightened section of the community, due to a perception of the advantages gained thereby with the approaching changes. With the majority the pressure of inexorable necessity forces the change as a matter of self-preservation in the advancing stream of progress.

Two Divisions—Leaders and Followers

It is this phenomena which creates the distinction between two major divisions of the human race, those mentally alert and those mentally indolent, or perhaps more indulgently specified as the trained thinkers and those of the popular mind—the one class the leaders of progressive thought and action, the other the great mob behind, crowded forward or crowded out by necessity. We find this distinction prevailing in almost every field of human endeavor and we have only to analyze those in which we may be particularly interested to discover their status or their position with regard to the beginning and end of this procession in the march of progress.

Suppose we concentrate attention on our own industry for comparison with other parallel or comparable lines, and with particular reference to that division of it—merchandising the product or selling the truck. By this process we may be able to secure a broad perspective view of the advance made so far, our present position, and the direction we should take with regard to the future. Perhaps we can diagnose the case sufficiently to be able to discover our strength and infirmities and apply to the latter the means which have secured success elsewhere.

With this project in mind the first move should be to withdraw from the rather close viewpoint from which we have been operating. We may have become narrow minded from our restricted attention to details. The groove we have worn ourselves into may prevent us from reconnoitering or we may suffer from the dilemma of the visiting sailor who complained that he could not see the town for the houses.

Present Needs Often Obscure Principles

Constant engrossment in the needs of the moment is almost certain to obliterate recognition of fundamental principle and unless we keep the latter evident our natural tendency is to retrograde. Nations have gone down to oblivion by the influence of this neglect, which may be specifically stated as sacrificing everlasting theory for the temporary benefits of practical result.

However, in a youthful and progressive democracy, like ours where the mechanical arts are fostered, protected and universally applied, theoretical sciences are studied not for the sake of pure knowledge but for their utility and it is due to the avidity with which we take advantage of this utility that our inherent vitality is stimulated and preserved.

Taking a restrospective view of industrial development from the beginning of the factory age, we observe that as soon as the scale of industrial operations advances beyond the scope which can be controlled by the personal activities of a single executive, organization becomes a necessity to control and direct the various functions of the entire institution. The more diversified the functions performed the more complex the organization and it is needless to point out that the perfection existing in modern industrial administration has not been of spasmodic growth but is rather the result of extended and skillful study of the difficulties involved and scientific solution by highly trained and experienced investigators.

The success attending the quantity production of automobiles has not been due to any contemporaneous development in methods of manufacture. These we inherited from allied factory practices previously existing in the manufacture of those modern utilities with which we have been familiar for several decades, such as sewing machines, fire arms, typewriters, bicycles, adding machines, telephone equipment, electric motors and numerous other devices which have long since become commercial and domestic necessities.

Unquestionably there have been collateral developments of signifiicant importance, but these are the expected and legitimate acccompaniment to any new branch of manufacture; these are, however, of minor caliber as compared with the project at large and constitute the evolutionary contribution towards general industrial or manufacturing development, which is only a fair remuneration so to speak for the valuable and well developed practices inherited.

Practically the same may be said of the problems involved in the financial projection and administration of the truck industry. There may perhaps have been some new and model methods interjected concurrently with the advancement so far, but there have been fewer new problems to solve in this department than in the manufacturing division. Nevertheless these two branches of the art have been prolifically endowed with a high order of administrative genius as compared with a signal absence of it in the department responsible for merchandising the product. This may be due to the elusive and indefinite characteristics of the latter, which on the one hand may deter the sober minded from undertaking the risk or on the other create the hallucination that there being an apparent demand for the product, there is consequently no real necessity for administrative genius in its marketing.

Change in Demand Produces Different Methods

That the penalty for this lack of foresight is due and payable within a short time is the sound conviction of some skilled observers in the market place. The hysteria which the new toy, so to speak, created is somewhat on the decline. The immediate absence of that class of demand which would be distinguished by an old-fashioned merchant as permanent is aggravatingly evident. That beneath the surface there is a demand of the most desirable character and largely influenced by the economic advantages or the superior utility of the machine is beyond question, but this is potential and not active and it is to stimulate this into activity that administrative ability is required.

With all the considerations before us surrounding the production and necessity for machines to transfer merchandise there is no question as to the immense development possible and in fact any recession would be quite contrary to the history of progress made with similar industrial utilities. However, the immediate necessity for scientific exploitation is equally conspicuous and this will require the greatest administrative genius within command.

Present Chaotic Conditions Must Pass

To those familiar with conditions as they exist in the majority of sales organizations at the present day the chaotic condition which prevails and the unscientific method of operation are in strong contrast with the highly developed efficiency existing in the production and financial departments as above specified, and how we can transfer to the field of sales operation, in some degree, the same character of administration is not a problem that admits of easy solution. It is within the scope of possibility, however, that we might put into execution there those practices which have been conspicuously successful in the marketing of the industrial utilities above mentioned since the underlying problems are practically the same, and we are simply engaged in the substitution of machinery for work which has hitherto been performed by muscular power, in a word replacing the horse by the truck.

One of the first deficiencies which must be recognized as existing in our present method of operation is our almost complete dependence upon the feeble efforts of inadequately trained salesmen without any assistance of an administrative character from the general management, which is unquestionably the supreme essential to success in any such new and intricate undertaking as the project contemplated. Co-operative assistance in every sales undertaking between the management and the operative salesman is the only sure cure or solution of the difficulties which present themselves. We are engaged in introducing new and revolutionary methods which not only call for intelligent analysis in the case of each application, but also demands a very superior ability to encounter and defeat the opposition which is inherent

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Digest of Part IV—Selling the Trucks

IN the present series of articles entitled "The Trend of the Times in Truck Work" an analysis has been made of the different conditions which have arisen concerning manufacture and sale, and with which the truck maker has had to deal. In the current article, Part IV, a broad view has been taken of the selling field, with the object of picking out the problems to which the maker must direct himself and at the same time putting in the hands of the dealer and the salesmen those necessary implements for the proper pursuit of his work. In a word, the effort in the current article is to intensify sales effort, or, to use a still better expression, to intensify the merchandising of motor vehicles for the transportation field.

In the intensifying of the merchandising field many valuable lessons can be learned by analyzing the methods of merchandising at present used by the big electrical and other industrial corporations of the present time. While it is true many of these other industries are in a more settled and mature condition than the commercial vehicle industry, it is none the less true that the methods they employ can be utilized to advantage in the truck field. One of the major values of a study of the merchandising characteristics of these outside industries is the knowledge it will give the truck manufacturer and dealer of the business methods of the concerns he must do business with. It is more or less a certainty that the business tactics employed in such industries in one type of transaction will be employed when it comes to the question of purchasing mechanical power in the form of trucks. To these people the truck is but a power plant forming a substitute for the muscular power of the horse, and there is no reason to believe that these business houses will institute different methods of procedure in purchasing this power plant than they would if purchasing a new heating equipment or lighting outfit for their factories.

throughout the entire community to change from habits to which it has become inseparably united by custom established long in advance of the present generation.

There is no particular system suitable for application to all cases, but the underlying principles which exist in introducing power devices and mechanical utilities in other lines are certain to secure as efficient results if applied to the motor truck industry. These practices should be our object lesson and are so evident to all of us who make use of this class of equipment as to require very little explanation, in fact, the application of them could be made with the least effort and expense by introducing into the motor truck sales field the same calibre of salesmen who have had successful experience in the lines referred to. A study or analysis of the details of any of these methods as at present practiced is well within easy range of any executive sufficiently interested to make the investigation and so little if any modification is necessary in transferring or making use of the processes that they could be applied on short notice and with insignificant expense.

In almost all of the principal cities of the country will be found branch offices of the leading manufacturers engaged in the exploitation of industrial apparatus, such as power plant equipment, including boilers, engines, dynamos, motors, pumping apparatus, refrigerating equipment and the minor accessories used in connection therewith. In almost all these lines the sales practices are very much more of an orderly and well regulated proceeding than we are accustomed to in the motor truck field, and it will be found that very much of the detail or preliminary work necessary in securing information as to the requirements of prospective purchasers and the digest of these requirements is performed by minor assistants and internal organization in a somewhat inexpensive manner, while the submission of the final proposal and the actual negotiation of the sale involves the services of an able salesman, augmented in a great many cases by the personal assistance of the local manager. In the motor truck business we largely expect that the salesman will be able to perform all these functions alone and unaided when acting in the capacity of a solicitor.

Method of Investigating Electric Matters

An example may explain this: Presuming that the proprietor of a hotel desires to supercede some defective or unsatisfactory electrical equipment with devices which will effect improvement and possibly economy and he communicates with two or three established industrial manufacturing organizations. The result will be that he will receive a call probably from a young man versed in the mechanical efficiencies of the particular apparatus of the manufacturer he represents. He will make the preliminary investigation to secure information as to the existing apparatus, its present mode of operation and if possible the cost, learning as much as he can of the conditions surrounding the case. When, on returning to his headquarters, he reports the investigation to his management, supplemented with the necessary business forms and documents peculiar to the organization which exhibit a complete account of the characteristics and performance of the apparatus to be superceded. This information is digested either in the local engineering department or at headquarters and by a routine process a recommendation is made to the local management which sets forth the desirable equipment to be offered for sale and a statement of the advantages to accrue from its employment in the case in question. This leads to the preparation of the final proposal form, which will very likely be submitted by mail, but in due time followed up by a salesman of considerable ability whose time and attention is concentrated in this manner upon the final closing of the sale rather than the tedious preliminary work incidental to its development. If the competition be keen the influence of the managing executive is called into play and all the persuasion which can be presented as an organization proceeding is brought to bear on the customer as an influence to close the matter successfully.

Sales Conventions Exceedingly Helpful

As a step in the direction toward considering some of these necessary and fundamental changes in the conduct of truck sales it is interesting to note that one of the national automobile organizations has decided to call a convention of sales managers during the coming season, when it is expected that the advantages of incorporating into our industry those practices successful elsewhere will be taken up in a vigorous and decisive manner. This is certainly a step in the right direction. It is a universal necessity and will not only confer a benefit on the organization to the manufacturer but will be a decided advantage to agents or dealers and their salesmen who are at the present time in a particularly isolated and helpless position. It is hoped that conventions of this kind will be repeated frequently and that some permanent organization will result which will confer as much co-operative benefit in the department responsible for sales as the engineers' society has been beneficial to the designing and production departments.

Considering in an elementary way some of the necessary qualifications essential to the salesman, it must be conceded that he should be fundamentally and completely conversant with the product of the organization which he represents and his confidence in his own ability to represent effectually the advantage of this product should give him that self-assurance which will sustain him when he encounters the opposition which we all know to exist in the prospective purchaser's mind with regard to the reliability of motor trucks. In a word, he must know his vehicles from A to Z. It is not sufficient to know wheelbase, horsepower, tire dimensions, load space and radius of operation, but to these must be coupled a comprehensive knowledge of the capabilities of the machine and its superior utility over whatever horse vehicles or other devices his prospect may be using at present in the transportation of merchandise.

Salesmen Must Know Transportation

But we cannot stop here. The truck salesman must know more than merely the product he is offering. He must know the details of transportation of merchandise in the city or town in which he is selling his product and the individual characteristics of the requirements of those merchants with whom he intends to negotiate business. If he can familiarize himself in advance with the conditions existing in any particular line of trade, or more specifically those existing in the case of individual establishments, he will be able to create a confidence in whatever statements he makes in presenting his proposition. To illustrate: Supposing his mission is to sell a 1500-

pound delivery wagon to the A-X Laundry Company, of Milwaukee. Before entering upon what might be considered the real selling conference with the representative of this concern, who will do the buying, the truck salesman should have familiarized himself thoroughly with the localisms of collection and delivery work as encountered by this concern. He should know the daily radius of horse operation; he should know the daily maximum and average of parcel collection or delivery; he should know the difficulties connected with this work; he should know the average length of each stop; he should know the conditions surrounding the main plant so as to be conversant with whether they are favorable or unfavorable for truck operation; he should know whether the driver performs functions other than those of a collector or deliverer of parcels, namely, whether he must solicit new business, make collections which cause delays, etc. In addition to these he should, if possible, discover the mental attitude not only of the proprietor but also the subordinate operatives toward the motor vehicle. With this fund of information at hand he is able to meet and repel every adverse thrust made by the prospective buyer during the conference. His ready and accurate knowledge silently impresses the prospective buyer, who realizes perhaps for the first time the indisputable fact that he himself is not so familiar with the details of transportation which he pays for as the casual observer who comes to offer him an improvement.

What is necessary in the laundry field is necessary in the coal field, the grocery field, the wholesale drug field, the building material field and every other field in the transportation world. Knowledge is the great pre-requisite of the salesman. He must have it. He can't make sales without it. Occasionally he may fill orders, but this is not creating a foundation for any future business.

Method of Collecting This Information

Undoubtedly the dealer, the manufacturer or the branch salesman is puzzled immediately as to the impossibility of obtaining such a fund of information on the different industries in his city in which he hopes to sell his vehicles. This is an easy problem.

He may proceed as follows: Some particular line of trade may be selected for operation upon and he should direct his salesmen to call consecutively on five or six of the principal merchants in this line, not with the purpose of effecting direct sales in these particular instances, but of accumulating particular information relative to the line of trade during his negotiations with each merchant. By proceeding in this manner the salesman will gradually cultivate a familiarity with the peculiar objections which these specific merchants may have and of the practices as they at present exist and the possibilities for improvement with the use of motor vehicles. For instance, he may find a prevalent inclination on the part of the merchant to point out that his stops are so long, his radius of operation so small, or the conditions of traffic so condensed as to prohibt the utilities of the machine from becoming advantageous. A study of the real or imaginary merit of these objections on the part of the salesman will fortify him in encountering similar arguments subsequently with the other prospects whom he may approach in the same line of trade. He may take it for granted that it is becoming common practice, particularly on the part of small merchants and those who hitherto have not ventured to use machines, to offer stereotyped objections which they have convinced themselves are insuperable, due largely to an absence of real knowledge of what can be accomplished with the machine, and the salesman's constant attitude should be to expect these objections and to conquer them efficiently by priming himself in each case as to how the work actually can be performed in a superior manner with a machine.

Indirect Method Sometimes Successful

It will frequently be found effective in negotiating a prospective sale to proceed in what might be called an indirect manner. The first effort on the part of the salesman should not be to secure an interview with the principal executive of the organization, who probably will have the purchasing power, but with whose peculiarities he may not be acquainted and may therefore be at a disadvantage. A better mode of operation would be to commence lower down in this organization to secure information as to the peculiarities of its personnel, their attitude in a general manner on the subject of using machines and whether they have had any experience in the use of such or are acquainted or friendly with other users and have therefore formed preconceived inclinations in one direction or another. Armed with knowledge of this particular character he may proceed to his final interview as the result of this information in an entirely different manner than he would have done without it and will possibly make friendly overtures as a preliminary to subsequent interviews meaning real business.

It should also be borne in mind that in approaching these business men instead of making the advance in too determined a way toward forcing the prospect into making a purchase a more effective manner will be to endeavor to bring him into conviction more quietly by impressing upon him the superior knowledge which you may possess of his existing conditions and his actual requirements. Furthermore, in a great many cases some subordinate executive will have a large share in making up the mind of the principal and it will be better procedure to convince this subordinate first and as a result secure his co-operation in presenting the matter to the management.

Instance of a Well Informed Company

In substantiation of some of the above arguments we may cite the case of a well known express company, which during the Chicago show delegated a number of its executives to look over the motor truck field in a general way and subsequently interview representatives of perhaps a dozen of the leading manufacturers. During these conferences it became conspicuously evident to those executives that many salesmen who appeared before them were defective in the information which they expected to receive and as the interviews proceeded it was noticeable on the part of competent observers in the truck field that the attitude of these gentlemen changed from that of being at a disadvantage in the early part of their investigation, due to a supposed lack of information, to one of confidence in a belief among themselves that they were actually in possession of more practical information on the subject than they had been able to accumulate during these audiences. As a consequence there has been some delay on their part in recommending purchases and an opposite condition might have prevailed if the salesmen who had the advantage of these interviews were so competent as to present forcibly the claims which they well might have done in a manner to produce immediate conviction.

As a further evidence to the argument that complete information on the part of the salesman as to the useful sphere in which his machines may be employed we might cite some cases which have come to our attention where large organizations after making motor truck purchases on a somewhat extended scale and applying them as best they could with the knowledge available at the moment have subsequently called into their service experts qualified to study their peculiar conditions and competent to rearrange the vehicle application in a manner to secure the maximum of economy. As a matter of fact there are very few companies owning large motor truck installations that are not questioning themselves on this very subject—as to whether they are getting the greatest possible service from the machines for the money expended.

Another noticeable indication of a very earnest desire to secure adequate advice and information is the effort being made by the officers of trade associations to have well informed speakers appear at their conventions and present in a general way the phases of truck application which may be particularly interesting to their line of trade. At all such conventions which have recently taken place it is noticeable that the subject strikes a chord of keen interest among the audience, who generally are reticent in the matter of discussing the papers or addresses presented before them, but who on occasions when the motor vehicle is presented immediately show a conspicuous desire to get at the real facts and absorb them intelligently. As a whole we may conclude that the present attitude of the entire purchasing public is that of thirsting for critical and reliable information as to how they may utilize what they are already convinced are the advantages of machine transportation in the performance of the work they are at present conducting with horse equipment.

Accumulation of Data Necessary

As a further aid in preparing the truck salesmen for the many exigencies he will be confronted with, the branch manager or the manager of the sales agency will do well to establish a special bureau or department for the collection of data on the various industries within his selling territory. Such a department at the beginning will not require the services of more than one person who can take the information obtained from the salesmen in the varied industries and arrange it properly so as to be suitable for use at a moment's notice. The collection of data in such a department is not limited solely to the research activities of the force, but the sales executive will soon discover that his department is securing additional data that have been compiled by different concerns in the various industries in which he is attempting to sell his product. He will discover perhaps to his own astonishment that not a few of the leaders in the different industries have been making a careful study of different phases of motor transportation as compared with horse transportation and if he develops the ideal business relationships, which should exist between the truck dealer and the buyer he will not experience any difficulty in securing all of the cost data that the buyer may be in possession of.

This collection of data, their systematic compilation and the scientific filing of such can be greatly assisted by proper data sheets covering every demonstration which the selling organization makes. This is being done now by the more enterprising truck dealers in several of the large centers of population. Not a few of these dealers have special daily report forms covering demonstrations in which the driver or the representative superintending the demonstration enters not only the amount of work done as well as weather and road conditions, but reports at length on the various physical impediments surrounding the operation of motor vehicles with the different concerns in question, as well as general observations on the operation of power vehicles in the same zone of activities but in different industries.

How Makers and Dealers Can Co-operate

The truck manufacturer can assist his dealers greatly in the accumulation of facts and in turn the dealer can furnish much for the benefit of the manufacturer. The ideal manufacturer constitutes himself or rather his data department into a clearing house for all of his branches and agencies. From each agency, irrespective of the state or city in which it is located, he can secure the desired report on each demonstration of his vehicles. By uniform report blanks, furnished by him to all of the selling representatives, he can facilitate the work of compilation a hundred fold and can at the same time insure himself that the activities of his different dealers are being directed along a uniform line. The reports of demonstrations that he receives from Portland, Ore., can be duplicated and furnished to the dealers in Portland, Me., and every other city in which he is represented. Similarly the demonstration reports from other cities can be handled with the result that in an amazingly short period of time the maker finds himself in possession of an almost inexhaustible supply of data on practically all of the industries in which power transportation is used.

If his compilation department has seized the opportunity it can institute a loose-leaf system of reports so that a uniform size of report sheet is used throughout his entire selling organization. The adoption of the uniform size of sheet makes it possible to install in every agency a loose-leaf binder in which all of the demonstrations, irrespective of where they are made, can be placed. Such a systematic arrangement simplifies amazingly the use of these reports by the salesmen, who if necessary can, when holding a selling conference, take with him 100 or more reports of demonstrations or annual performances of vehicles all of which would have vast influence in the conviction of the buyer.

Such positively directed, definite salesmanship effort is needed. Organization and concentration are the two great essentials in conjunction with it. The scheme must be fathered by the truck manufacturer. It would be almost impossible to expect such a scheme to originate with the dealer, and if it found origin in such a source it would be necessary for the truck maker to standardize it for his general use.

The collection of such data by the maker is not limited to the work of demonstration with his vehicles in the different industries throughout the land, rather it should embrace a performance of vehicles covering periods from 1 year up. If a truck manufacturer has had a fleet of vehicles in operation in Boston for 5 years he should bend every effort to secure cost and operation sheets covering each year of the period.

Legislative and Legal Matters of Interest

The General Law Respecting Commercial Vehicles and Their Operation on the Highways—What Constitutes a "Commercial" Car

By X. P. HUDDY, LL.B.

AS the increase in the use of commercial vehicles develops and the traffic of our city streets and country roads is made up more and more each year of cars propelled by power, the legal status of the business machine and the law governing the use and operation of these become subjects of interesting study.

It will be the purpose to define, in so far as is now possible, and within the space available, the legal position which the commercial vehicle occupies in reference to other traffic existing on both state and interstate highways and to outline the various rights, obligations and duties of owners and operators.

First, we should have a clear conception of the kind of a vehicle known as a "commercial" car. The term is modern because only in recent years the motor vehicle has been made a practical means of transportation. It may be said that a commercial automobile includes all self-propelled vehicles which are operated on the ordinary highways and are used in commerce either local or interstate, and it should be understood that log haulers or traction engines are included, but such motor-propelled vehicles as run only upon rails or tracks, motor fire apparatus and the like are excluded from our definition.

None of the state laws has attempted to define the term commercial car, but the automobile law of the State of Maine mentions motor trucks used for commercial purposes. Under the term there would be included ordinarily, should legal interpretation of it be rendered, such vehicles as taxicabs, delivery wagons, automobile stages, trucks and sight-seeing cars.

All public automobiles are necessarily commercial motor vehicles, but the converse of this, that all commercial vehicles are public automobiles, is not true, and the question whether a commercial automobile is a public vehicle is of supreme importance in determining legal liability. In the first place, a commercial automobile used for public purposes such as conducting a stage line or a taxicab service, is a common carrier and is to be placed in the same category as railroads and steam vessels carrying passengers. The proprietors of these are held responsible for the highest degree of care and precaution in the protection of life and property. Another respect in which the public commercial vehicle differs from the private commercial vehicle is that the public vehicle which transports all persons or property applying for hire ordinarily exercises a franchise which it may be necessary to obtain from the municipality or state, as engaging in public transportation by a person or corporation is considered in the nature of a public enterprise and is subject to public supervision and control. It is for these reasons that rates of fare are prescribed for the services of taxicab companies and also railroads.

The purely private commercial vehicle is not subject to public regulation other than that control which is imposed over automobiles generally. The department store which delivers its goods by means of a motor-propelled delivery wagon is not carrying on any public or quasi-public enterprise, nor is the manufacturer of a commodity who delivers his product by similar means engaging in public transportation, such as the express company which occupies the same position in law as a railroad or other common carrier.

Commercial automobiles are also to be classified further according to the nature of the commerce they are engaged in. We have in the United States two, or speaking more correctly, three distinct kinds of commerce, namely, state—that which exists wholly within the borders of any particular state; interstate—that which is carried on from one state into or through another, and foreign commerce, which is that carried on between the United States and a foreign country. Many commercial automobiles are engaged in the first two kinds of commerce, and some are engaged in the last along the northerly and southerly boundaries of our land.

The nature of the commerce engaged in may be of the greatest importance in respect to legislation, especially in the levying of taxes, either by a state or municipality against the commercial motor vehicles or on the privilege of using or operating them in any particular place. For example, some of the localities in the State of New Jersey levied a tax upon the privilege of wagons of New York department stores coming into these localities and delivering goods. This tax was contested in the federal courts and it was held that it was illegal to impose it because the wagons were engaged in interstate commerce by delivering goods from the department stores in New York into New Jersey. So if a commercial vehicle is engaged in interstate commerce or transportation it is protected by the Federal Government, as no state or municipality possesses the power to make any regulation or to levy any tax which will interfere materially with commercial intercourse between the states.

Many express companies have substituted motor trucks for the purpose of transporting merchandise. Some of their transportation is purely local, such as the delivery of parcels from one place to another locality in a city, county or state, but where the transportation consists of taking an article from a house, for example, to the express company's office and then carrying it to a railroad which is to transport the article to or through another state, then the article becomes a commodity of interstate commerce from the moment it is received into the hands of the express company's agent. From the point of shipment to the point of delivery, the article is protected by the Federal Government.

Motor Trucks Certain to Oust Army Mule

As a Result of a Very Strenuous 1500-Mile Trip Which Has Just Been Made by an Army Officer with Three Different Sizes and Makes of Commercial Vehicles, the Opinion Is Advanced that They Are a Success

"From my experience with motor trucks I am confident that a type of truck will be developed which will oust the historical army mule. I realize the deep-rooted sympathy which surrounds the army mule and it will not be an easy task to substitute the motor truck but why should the United States go to war with an antiquated means of transportation? Where real efficiency and economy are pitted against sentiment, the latter must step aside. This change to mechanical transportation must come gradually, the trucks being substituted as the mule becomes unserviceable."—Captain Alexander E. Williams, U. S. A.

WASHINGTON, D. C., April 20—Captain Alexander E. Williams, of the infantry branch, United States Army, who has been studying carefully the possibility of using motor trucks as a substitute for the army mule in military transportation, recently made a test in a 1,509-mile trip with three trucks from this city to Fort Benjamin Harrison, near Indianapolis. The long trip was commenced on February 8 and ended March 28, the route by way of Richmond, Va.; Raleigh, W. Va.; Greensboro, N. C.; Atlanta, Ga.; Chattanooga and Nashville, Tenn. and Louisville, Ky. to the fort being over as varied a class of road as could be found, ranging from the best macadam to the most impossible quagmire.

After an experience of this nature, after breakdowns in the different trucks, after tire difficulties, after having ferry troubles, after being pulled out of quagmires by mules, after slipping off icy roads into deep ditches, and after every possible experience on bad American roads Captain Williams is outspoken in his belief that the motor truck will oust the mule in spite of years of sentiment for the latter and that this change will be a gradual one. With the motor truck it is efficiency of transportation, with the mule it is antiquated transportation and if war should arise the mule would go into the discard.

In his report of the trip Captain Williams gives with great accuracy the details of each day, the road conditions, mileage, truck troubles, etc.

He started off on February 8 with four trucks as follows: White 1.5-ton truck with pneumatic tires, singles front, duals rear; a Four-Wheel drive gasoline truck consisting of a pleasure car chassis and a special body for a 1-ton load; a 1.5-ton Sampson; and a 1.5-ton Autocar. The first three were government vehicles. The Autocar company sent its truck along at its own expense.

Three trucks, the White, Four-Wheel drive and Autocar, finished the trip, the Sampson dropping out due to a burned connecting rod bearing on the second day out of Washington. All of the trucks had more or less mechanical trouble due to the terrible road conditions and frequent delays were occasioned by waits for spare repair parts. The daily trips averaged anywhere from 10 to 100 miles, depending on the roads. The day's trip into Roanoke Rapids was 98 miles; on one day the White made 112 miles in overtaking the others after a delay for repairs; 80 miles was made on the day's run into Anderson, S. C., and also on the run into Atlanta. The attached itinerary shows the general progress of the trucks with road conditions and is a digest of Captain Williams's report.

Feb.	Miles	
8—	33	Dumfries
9—	16	Stafford Courthouse
10—	10	Fredericksburg
11—		Sunday
12—	60	Richmond
13—	98	Roanoke Rapids, N. C.
14—	22	Vaughan
15—	30	Henderson
16—	30	Wake Forest
17—	25	Raleigh
18—		Sunday
19—		Back to Wake Forest, repaired Four Wheel Drive
20—	25	Durham
21—	20	Morgan Hill
22—	25	Burlington
23—	23	Greensboro
27—		Returned to Burlington to repair Four Wheel Drive
29—	36	Lexington
Mar.		
1—	40	Concord
2—	23	Charlotte
3—		Delayed repairing White
4—		Delayed repairing White
5—	45	Grover, N. C.

Mar.	Miles	
6—	16	Gaffney, S. C.
7—	11	Cowpens
8—	80	Four W. D. to Anderson
	45	Autocar to Greenville
9—	70	Four W. D. to Commerce
	56	Autocar to Fair Play
10—	80	Four W. D. to Atlanta
		Autocar to Ashland
11—	112	White repaired to Lavonia
		Autocar to Swanee
12—	30	White to Commerce
		Autocar to Norcross
13—	30	White to Winder
	20	Autocar to Atlanta
14—	40	White to Norcross
15—		White to Atlanta
16—	69	Rome, Ga.
17—	45	Lafayette
18—	30	Chattanooga
19—	46	Tracy City
20—	45	Beech Grove
21—	50	Nashville
22—	57	Bowling Green
23—	75	Magnolia
26—	40	
27—	75	Franklin
28—	31	Fort Benjamin Harrison

Besides the accomplished daily mileage and road conditions Captain Williams made reports on tires and gasoline during the run. The distances on a gallon of gasoline were:

White, miles a gallon	4.5
Four-Wheel Drive, miles a gallon	4.0
Autocar, miles a gallon	4.4

The consumption of oil during the trip was as follows:

White, miles a gallon	127
Four-Wheel Drive, miles a gallon	109
Autocar, miles a gallon	60

The report of Captain Williams on the tires during the trip is equally important and he has without hesitation reported that solid rubber tires must be used for army field work and that a solid tire with a soft flat tread is best suited to the army needs. He reported further that pneumatic tires should not be used and that Newmastic-filled tires were better than pneumatics and the third recommendation was that block tires should be avoided.

The detailed tire report follows:

Leaving Washington, the White had 37 by 4.5-inch Diamond pneumatics on front and similar duals on rear. At Richmond, 119 miles, the duals were removed and Newmastics substituted. At Atlanta, Ga., 816 miles, the Newmastics were badly torn by the chains. The best two were selected and placed on the inside of each rear wheel and one pneumatic put on the outside. At Chattanooga, 960 miles, Newmastics 37 by 4 inches were put on the front wheels and dual pneumatics on the rear. At Nashville, Tenn., 1101 miles, the pneumatics were put on the front wheels and a new set of Newmastics put on the rear wheels. This combination was not changed. One of the Diamond pneumatics was used from Washington to Franklin, Ind., 1308 miles, without a puncture. It was used on the front wheel from Washington to Atlanta, 816 miles; on the outside of a rear wheel from Atlanta to Nashville, 285 miles, and on the front wheel from Nashville to Franklin, Ind.

The Four-Wheel Drive truck started from Washington with 42 by 4.5-inch Goodyear solid rubber tires. At Atlanta, Ga., 816 miles, the 42-inch wheels were removed and 36-inch sizes substituted, being fitted with 36 by 4.5-inch Firestone pneumatics.

The Autocar used 42 by 4-inch solid rubbers in front and Kelly blocks in rear. At Atlanta the 42-inch wheels were removed and 36 by 5-inch pneumatics put on in their place.

Maker and Dealer's Service Relations*

SERVICE is the keynote in the majority of sales of commercial vehicles as made today. From the dealer's standpoint, the coöperation of the manufacturer in this matter, or at least his attitude toward it, is of the highest importance. Naturally, the dealer is looked to for this service by the customer because he is on the ground and consequently is the one to whom the buyer will appeal at the first sign of trouble. There is a reason why the dealer should expect the customer to appeal to him for this service, for the manufacturer is allowing the dealer a certain percentage of its profits on the sale of the truck to enable the dealer to render the customer such assistance as may be necessary to give good, efficient service.

In establishing our service department, one of the first things done was to pick out mechanics. These were selected with the following ideas in view: First, they must be good mechanics, familiar with our trucks, and capable of making any adjustments. Second, they must be men of sufficient intelligence to explain the proper methods of operating and taking care of the truck to the driver and the owner.

These men were carefully instructed as to their duties before being sent out on the road. They were then given a list of all users in a certain territory which had been assigned them, and instructed to call upon every user in the territory at regular intervals, of course calling on the dealer first, and the customer through the dealer.

The duties of these road men are numerous, the paramount idea, however, being to assist the dealer in instructing the user of the truck in the proper method of operating his car, and to show him the disadvantages in overloading and overspeeding. There are few cases, if any, where a business man buys a motor truck, that he does not need the assistance and advice of the manufacturer and the dealer as to the right way to operate and care for his truck, and no sensible man will refuse to accept this information, but, on the other hand, will thank him for it.

These service men not only instruct the users and the drivers of the trucks how to operate them, but make such repairs as may be needed on the trucks they inspect, thereby saving the owner many hundreds of dollars in catching some little trouble which can be repaired easily, but, if allowed to go on from time to time, eventually would cause some more serious break, and, in all probability, lay the truck up for several days, besides costing the owner a considerable amount of money for repairs. By merely tightening up a loose bearing, or making some other slight adjustment, the service man protects the user and his services become invaluable to the customer, the dealer and the manufacturer as well.

Now, while it is essential that a manufacturer maintain a service department, it is just as necessary that the dealer maintain a similar department, a department devoted to trucks only, preferably isolated from his pleasure car business, providing he is handling pleasure cars as well, for the two lines will no more mix than will oil and water; maintain a place where parts can be carried in stock, and repairing done neatly and promptly; have a good mechanic, one who knows his business, and can say "Yes" or "No," and back it up; show the business man and the prospective buyer of the truck that he means to serve him to the best possible advantage; that he is in a position to give him efficient service.

They say it is expensive to maintain a service department. I admit that it is, but it is also expensive to advertise, isn't it? A good service department is the best advertisement that a dealer can buy. It speaks louder than printer's ink, regardless of the form in which it may be used, and will take him to the head of the class in the motor truck field quicker than any other method he can possibly pursue.

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*Extract from article in *The Gramm* by W. H. Moore, manager sales department.

The Vehicles Used in the Big Army Test as They Appeared at the Finish. At Left, Four-Wheel Drive and White. At Right, Autocar with Capt. Williams on Driver's Left

Insuring the Commercial Vehicle

The Various Kinds of Insurance in Force, Cost of Each, Different State Regulations Relative to It, Attitude of Agents, Dealers, Owners and Manufacturers—Why It Costs Too Much and How It Can Be Lowered

Part II—Concluding the New York Situation

CONCLUDING the New York situation, previous to taking up another state, the general layout was given in the previous installment. There it was pointed out that there are four general kinds of insurance in force, namely, fire, including theft and transportation, liability, property damage and collision. The rates for the first two depend upon the value of the vehicle which is being insured, but even this is controlled by the insurance companies which publish a table of costs and fix a percentage of that valuation for subsequent years. Property damages are based on horsepower of the car, according to the same published list. Collision rates are governed by the nature of the business which the owner is engaged in, higher for the more risky occupations and lower for those which might be considered more safe.

Digest of Part II—Concluding New York

A number of New York City's largest users carry no insurance whatever, including the cab and 'bus firms and the brewers.

MOST of the larger manufacturers of trucks have a blanket policy covering the entire factory output, and giving a cheaper rate.

SIXTY per cent. of the firms interviewed consider existing insurance rates too high, and 45 per cent. of the total possible different kinds is not carried.

In addition, a number of practical cases was cited, the majority of the men and firms interviewed in New York City admitting that they took a chance on doing without insurance in one or all forms for the sake of saving the unusually high charges which protection entailed.

The same situation exists with the Fifth Avenue Coach Company and the New York Transportation Company, neither of which carries anything but fire. As to the other divisions, an annual sum is set aside to care for the possibilities, which amounts to the company insuring its own cars. Mr. Meade, manager of the coach company, stated that it would be impossible for this concern to make any money if it paid the ruinous rates demanded on its vehicles in all classes of insurance. In this connection it was stated that taxicabs and 'buses in New York City are required to pay over $400 a year for liability insurance alone, making a total of nearly $600 a year for all four kinds of insurance. On a fleet of 26 cabs this would be $15,600. On its more than 70 'buses the coach company would have to pay in excess of $42,000 a year, while the Transportation company would have to pay over $100,000.

A number of factory representatives were interviewed, also, the opinions of these varying widely, except that the general agreement was on the subject of prices being too high. The notable exception to this was the American Locomotive Company, for which J. O. Hobby, Jr., stated that his concern covers everything but property damage in a very thorough manner and considered protection necessary at any cost. Possibly the blanket policy covering every car turned out from the factory, and which carries with it a very low rate, has much to do with this attitude. On the subject of fire insurance, however, Mr. Hobby took the stand that there is no real hazard. He stated that his company has not had a car or truck take fire in 6 years. In cases in which the vehicle is sold on a time basis fire insurance is insisted upon as a matter of protecting the maker's equity, but beyond this no advice or suggestion is offered to purchasers.

"On all trucks owned or controlled by the United States Motor Company," said W. W. Owen, "fire, liability, collision and property damage— in fact, all kinds, are carried, regardless of cost." Mr. Owen gave as his opinion that the cost was not too high for the protection. He regarded all insurance as necessary, and cited a recent instance to prove the point. A driver of more than 6 years' experience, and with a reputation of being a very careful man, stalled his car on a country road in order to avoid a horse and wagon. Getting out to start the car again, he did not retard the spark, and a back kick resulted, breaking his arm. This was his first accident. Mr. Owen also calculated that insurance costs were not too high nor as high as they would be from the insurance companies' profits. He said that the whole tendency of rates in the last few years was upward, and that from the lack of profits indicated in the motor car departments it was apparent that they would have to be revised upward again in a short time. This, he thought, proved the necessity for insurance.

On all of the vehicles which it imports, J. Jaccard, head of J. Jaccard & Co., stated that very complete insurance is carried. This is in the form of a floating policy, which is issued by one firm and covers everything. While admitting that this costs a great deal of money, he considered that the very complete protection, coupled with the elimination of all worry, was worth whatever it cost. While the vehicles are on the water they are protected by a blanket policy which includes breakage as well as the ordinary fire and other forms. This is put into force automatically by the brokers handling the business when the truck is completed at the factory, and continues until it is delivered upon the

Short Rate Cancelation Table

FOR TERM OF ONE YEAR

	Per cent of Annual Prem.		Per cent of Annual Prem.
1 day	2	50 days	28
2 days	4	55 "	29
3 "	5	60 "	30
4 "	6	65 "	33
5 "	7	70 "	36
6 "	8	75 "	37
7 "	9	80 "	38
8 "	9	85 "	39
9 "	10	90 " or three months	40
10 "	10	105 "	45
11 "	11	120 " or four months	50
12 "	12	135 "	55
13 "	13	150 " or five months	60
14 "	13	165 "	65
15 "	14	180 " or six months	70
16 "	14	195 "	73
17 "	15	210 " or seven months	75
18 "	16	225 "	78
19 "	16	240 " or eight months	80
20 "	17	255 "	83
25 "	19	270 " or nine months	85
30 "	20	285 "	88
35 "	23	300 " or ten months	90
40 "	26	315 "	93
45 "	27	330 " or eleven months	95
		360 " or twelve months	100

FOR TERM OF THREE YEARS

	Per cent of 3 yr Prem.		Per cent of 3 yr Prem.
1 month	10	19 months	72
2 months	17	20 "	73
3 "	20	21 "	75
4 "	23	22 "	77
5 "	27	23 "	79
6 "	30	24 "	80
7 "	33	25 "	81
8 "	37	26 "	83
9 "	40	27 "	85
10 "	43	28 "	86
11 "	47	29 "	88
12 "	50	30 "	90
13 "	53	31 "	91
14 "	57	32 "	93
15 "	60	33 "	95
16 "	63	34 "	96
17 "	67	35 "	98
18 "	70	36 "	100

Short Rate Cancellation Table, According to Which the Earned Premium of Liability Policies Is Adjusted When Cancelled by the Assured

docks of New York.

Mr. Jaccard cited several instances of the attitude of American owners toward insurance. For instance, the Welz & Zerweck Co., Brooklyn brewers, have 18 trucks, consisting of Mack, Saurer, Aries, Packard and General Vehicle makes. Some owners consider that less insurance is needed on electrics than on gasoline, but in this instance the latter forms were owned first and the battery-driven types constitute but four of the 18. This firm carries no insurance whatever, although the cars are used every working day in the year and are kept in two wooden stables which have been made over for the commercial vehicles. This installation started in 1910, so the lack of insurance has continued for two years.

As a matter of fact, few brewers carry insurance on their trucks. Probably this is one of the inheritances from the former horse method of transporting their product, since none of them carried insurance on either horses or wagons, nor do those still using them.

The White Company, according to its New York branch, carries all forms on the trucks from the time they are turned out at the factory until delivered to purchasers. This is under a blanket policy which reduces the cost of a car very materially.

The Packard Company, Detroit, also has a blanket form which covers all motor cars and all forms of insurance. While it is not the policy of the company to give advice to purchasers on this subject, allowing its own methods to stand as an example, still something is done along this line. The company has compiled and is giving out typical cost of operation sheets on its trucks, both 2 and 3-ton sizes. In this the insurance is put down as 6.5 per cent. On the former-sized vehicle this amounts to slightly less than $210 a year, and for the latter less than $250. This does not include property damage, but does include fire, collision and liability. On the basis of the charges previously given it is doubtful if collision could be included at these figures, particularly not in the classes of business rated as poor risks.

Summing up the New York situation, of the 14 instances, eight consider the rates altogether too high, three admit they are high but think them fair, while three more consider them perfectly satisfactory. Of the last six, however, four are using blanket policies. Eliminating these, 60 per cent. consider the rates altogether too high.

Of the 14 instances 10 carry no property damage, but this includes three who carry nothing whatever, seven have no collision while two more considered it of doubtful utility in view of its cost, five carry no liability and four no fire. Three carry no insurance whatever.

Digest of Part I.—April Issue

SO high are insurance rates that many good business men have taken a chance and do not carry any.

AUTOMOBILE rates high enough at best, have been applied without change to trucks and other commercial vehicles, which do not present parallel or equal risks.

IT is possible by carrying all four kinds of insurance on a 3-ton truck, in a reasonably safe business, to pay out in premiums and interest the equivalent of the truck's first cost in less than 10 years.

ONE taxicab owner of 26 vehicles in New York City does not carry any fire insurance, preferring to replace a cab a year to paying more than this in premiums.

PROPERTY damage rates are based on horsepower and bear no relation to the possible speed nor permissible total weight.

MANY firms do not carry collision or property damage, preferring to employ very careful drivers and set aside a small annual surplus toward these contingencies.

Prohibited Risks

The following and similar risks are absolutely prohibited by this Company:

ALL STEAM AUTOMOBILES.
All livery or rent cars
Machines purchased on the installment plan unless fully paid for at time of applying for insurance
Machines exhibited in pavilions, halls and other places of public amusement, including Fair Grounds, unless first authorized by Home Office.
Machines on which there is a mortgage or lien of any kind.
Machines in litigation or dispute.
Machines second-hand, unless approved by Home Office or General Agents
Machines of "Sight-Seeing" type, unless approved by Home Office or General Agents.
Machines on which there is concurrent insurance.
Machines used for racing purposes.
Machines built prior to 1910 unless approved by Home Office or General Agents.
Machines rejected by other Insurance Companies.
Machines permanently out of commission, *whether in good order or not.*
Machines having both electric and gasoline power.
Machines having other than original engines unless approved by Home Office or General Agents.
Machines the manufacture of which has been discontinued.

Agents must confine acceptances to owners who are well and favorably known to them and decline to insure all cars, the manufacturers of which have, in any degree, discontinued manufacturing the various parts of the same.

List of Risks Prohibited by Conference Insurance Companies for Fire Policies. Note That Steam and Combination Gasoline-Electric Trucks Cannot be Insured, and Second-Hand or Sight-Seeing Cars Only Under Special Approval

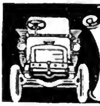
Instructions and Limits

Amounts to be insured must not be more than actual value and be limited as follows.
(No Automobile written for more than its Cost to Assured.)

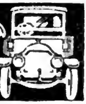
Current List Price	Models	Per Cent to be Written
$3,000 and over A to E	1910	Not exceeding 60%
	1911	Not exceeding 70%
	1912	Not less than 50%
	1913	Not less than 50%
$1,500 to 2,900 F to H	1910	Not exceeding 50%
	1911	Not exceeding 65%
	1912	Not less than 50%
	1913	Not less than 50%
$500 to 1490 J to O	1910	Not exceeding 40% Note A
	1911	Not exceeding 60%
	1912	Not less than 50%
	1913	Not less than 50%

NOTE A.—Decline all 1910 Models listed at under $1,100 and all 1910 2 cylinder cars, also all [illegible] cylinder cars of cheaper grades.

Instructions to Insurance Agents on Portion of the Current List Price Which May be Insured. Note That 1912 and 1913 Trucks Must Insure at Least Half on Fire Policy; Older Than 1912, Less Than 70 Per Cent



The Editor's Viewpoint



Bookkeeping and Truck Success

ONE thing which must be impressed upon merchants who buy commercial vehicles and those considering their relative economy is the matter of keeping their accounts in what might be termed for want of a better name a universal or standard form.

Every salesman attempting to convince a prospect has met with and is daily meeting this in one form or another. The salesman encounters statements like this: "My horses cost me but $3 a day apiece." Now any well-informed man knows that this cannot be correct, and the salesmen for commercial vehicles better than anyone else. If he be wise he will inquire in a systematic and careful manner just what accounts are carried against the horses and what are not. Soon he will discover the omission which has made the large difference in the final cost figures.

In some cases this takes the form of use of a building for which no rent, depreciation, interest or other charge is made. When it is called to his attention the man says "I own it; why should I charge myself anything for the use of it?" In one particular case in which this method was followed by an alert and well-informed salesman, he was able before he left the man who had given his total horse costs at $3.50 to prove that the actual amount was something like $8.16 a day.

When the united manufacturers of the country have forced the use of a system of accounting, regardless of how the books are kept or of other details, which takes into account every item in the actual cost, the matter of selling vehicles will be much easier than it is today.

But it is not alone for the sales end that this should be done; those merchants who have bought a commercial vehicle and have put it into use should be shown and practically forced to use a proper method of accounting for the cost of this. If this be not done two owners, in comparing accounts of trucks having equal carrying capacities, will find a huge discrepancy in their figures which will not be to the credit of the higher one, unless it can be shown that one has not included everything.

In the case of the largest users with hundreds, and some time in the near future with thousands, of cars, the adoption of such an accounting method will enable them to determine in a short time those makes which are of the greatest utility and show superior economy in their business. While it hardly is to be expected that large firms will keep their books in a careless or sloppy manner, still it is both possible and probable that the motor truck manufacturers as a body can tell them the things they will want to know about the cars and the best way to keep their books in order to get them.

Before this can be brought about the manufacturers will have to get together themselves and adopt a few simple rules. Thus, in the matter of amortization it ought to be easy to agree upon a plain method of figuring this for the different classes of business, if necessary, adopting a table of those which are more risky and thus should have their cars written off in a shorter time, and similarly for the easy kinds of work in which trucks will last a long time. The same can be said as to interest, repair sinking fund, tire depreciation, and the many other items which go to make up the two totals of daily fixed and running charges.

The first need is for the manufacturers to get together and agree upon the basis of a campaign, the second to prosecute it vigorously. This will result in increased sales, in lessened sales expense, in many more repeat orders, and in other ways will be beneficial.

Selling Trucks and Selling Service

THOSE makers today who are doing the most profitable business in the commercial vehicle line are the ones who are selling service, not cars only. The motor truck must make its way as a source of increased economy, improved efficiency, greater speed, greater carrying capacity, or in some other manner. In doing this for the merchant the latter soon begins to lean upon this method of transportation. When the first accident or trouble comes he will turn instinctively to the firm selling the truck. If the latter be prepared to take care of him immediately, to send a mechanic to remedy his troubles, to rent a substitute vehicle while his is being fixed, or in other similar ways to aid him in carrying on his business temporarily, all will be well, and he will admit that he has made a wise move and urge his business neighbors and friends to do likewise.

If, on the other hand, in such a time of trouble he is left to his own devices, given to understand that the company simply sold him the vehicle and that everything subsequent to the sale is up to him, he will begin to think he has made a mistake. This, repeated several times, will convince him that he has, and ultimately he will condemn all commercial vehicles and will go out of his way to tell business friends what happened to him.

That this is an actual and partly understood condition among merchant buyers may be proven by a remark which the editor heard a furniture man make at a recent show. This man has had a 3-ton truck for over a year, and admitted that it was worth $50,000 to him in the past 12 months for the improved reputation, the advertising and the greater amount of business which it enabled him to get and hold. His statement was that a person is either a fool or a poor business man who buys an unknown vehicle, one without a reputation, a big firm back of it and a service depot in his city. Continuing, he said a merchant changing his transportation system should buy service and reputation, the former being more important.

This attitude should give many a maker a clue to slow sales in certain territory and the immediate and positive remedy for it, a service department in the largest cities first and in the others as business increase warrants it.

Late News of the Month

New York Holds Annual Truck Parade and Outdoes Previous Years—No Reduction in Truck Tire Prices—Lansden Electric Company Changes Hands—Progress of W. C. P. Reorganization—Other News Items of Interest

NEW YORK, April 15.—On Saturday last the Motor Truck Club of this city pulled off its annual parade with great eclat and much consequent advertising of the commercial vehicle. The parade was inaugurated a year ago, when no less than 326 cars formed the longest line of motor trucks ever assembled at one time for any purpose whatever. It was the aim of the club officials to outdo this mark, and they succeeded very well. Due to the large number of late entries and a considerable number of cars parading unofficially, the exact number cannot be given, but it can be stated as more than 400 for the official entries and starters numbered 344.

The parade was held for the general good of the industry, the idea being that such a huge demonstration of the power vehicles in actual use at present and their apparent possibilities in other lines of business would attract the attention of many men who cannot now be reached as prospective buyers. Over and above this feature of possible sales results it was thought that the advertising which the industry would receive would more than compensate for any time or trouble expended.

In order to get out as many as possible of the vehicles, the club officials appointed several special committees to attend to the various details in connection with the event, and the entire organization, composed of the salesmen for motor trucks in the metropolis, as a committee of the whole to get entries. This was done early in March, and the results showed that this was none too early.

The parade was formed with the cars in alphabetical order of makes under the supervision of E. W. Curtis, Jr., of the General Vehicle Company, at the Battery, and covered in its line of march practically all of Manhattan Island, going up as far as 125th street, where the officials reviewed it. There was no official countermarch, but with the exception of those trucks having deliveries to make above that point all vehicles returned over the route in a reverse direction to the lower part of the city. The route selected was over 8 miles long, and took 2.5 hours to cover. The parade approximated 1 hour passing any one point, due to the breaks made by the traffic squad. In this last respect, however, it was managed much better than last year.

A very large part, probably more than 15 per cent. of the cars in line, was following out the day's work, the length and route of the parade constituting only a pleasing diversion for the drivers, who concluded their deliveries afterwards. This gave the display a businesslike air which was not lost upon the thousands of observers.

In the way of statistics, there were 296 gasoline cars, 44 electrics and four gasoline-electrics on the list of regular entrants, while the additional starters were about evenly divided between the two forms of power. The General Vehicle had the largest single fleet of cars with 49, Autocar following closely with 48. Some of the others were: Sampson, 23; G. M. C., 20; International, 16 (10 Macks, 6 Saurers); about a dozen each of Alco,

Scene at the Battery, New York City, During Formation of Recent Truck Parade, Showing the International Motors Part of the Long Line Ready and Waiting

Peerless, Pierce, White, Walter and Chase, and many more with smaller numbers. All told, 53 makes were represented. Fully half the trucks were of 3-ton capacity or over. No less than 72 were shaft driven, eight worm and the balance side chains. Left-hand control had but 28 adherents, while the driver over the motor type totaled 65 per cent.

NEW YORK RECEIVES ELECTRIC ENGINE

New York City, April 17.—The fourth of this city's converted steam fire engines has arrived, and has been put into service. The department officials cannot see their way clear to scrap perfectly good first and second-class steamers which have cost $6,000 or more, even to satisfy a desire for more speed and a belief in the superiority of self-propelled apparatus.

In the working out of this problem the first trial consisted of hauling a fire engine back of a Couple-Gear tractor. Next, a Nott gasoline and steamer combination was built and put into use. The third attempt took the form of a Christie front drive system attached to an old steamer. The latest conversion, which bids fair to be the most successful of the four, consists of a pair of Couple-Gear wheels replacing the usual front wheels and horses. Between the wheels and the boiler there is just room for the battery box. In essential details this follows the well-known Couple-Gear construction. The 80 cells of National thin-plate type battery will give a radius of 20 miles. The rear wheels are unchanged, while the new fronts have 36 by 3 5-inch dual solid rubber tires.

This engine, which carries the old number 117, has been sent to its permanent post at the Jay street station in Brooklyn.

CREDITORS' COMMITTEE FOR W. C. P.

New York City, April 16.—A committee to bring the stockholders and creditors of Wyckoff, Church & Partridge, Inc., into closer touch and thus bring about a resumption of business under reorganization, was chosen at the creditors' meeting here. This committee consists of H. M. Swetland, chairman; Chester Griswold, secretary; R. R. Moore, president Commercial Trust Company; A. G. Bruckman, president Livingston Radiator Company; A. Hauschild, Polack Tire Company, and L. B. Rolston, attorney.

Negotiations toward reorganization are well under way, and it is said this will take the form of an adjustment rather than a radical change.

MACK INTERESTS BUY OUT LANSDEN

Newark, April 13.—The control of the Lansden Company of this city has passed from Thomas A. Edison to John M. Mack and his Allentown and Philadelphia associates. Operations will be continued in Newark, the new factory on Freylinghausen avenue being occupied about May 1. A report from Philadelphia where the principal financial interests of the new group are located would seem to indicate the construction of an additional new factory in Allentown, Mr. Mack's home city.

This is an independent venture on Mr. Mack's part, as it is understood that the International Motors Company has no hand in it. No future plans have been announced, and none will be until Mr. Mack returns from a vacation trip to Canada.

NEW ELECTRIC VEHICLE CONCERN

New York City, April 16.—The recently incorporated Atlantic Vehicle Company, of this city, has blossomed out into a full-fledged concern with Broadway offices, a Newark factory, a high-grade engineer and many men of millions back of it. The latter consist of McKinley Boyle, president of the Continental Car Company, Louisville, who has been elected president and treasurer; Ralph Sanger, a member of the well-known machinery firm of Wonham, Sanger & Bates, who has been elected

Another View of the Motor Truck Parade Formation on the Battery, New York, Showing the Sampson and Others Near the End of the Alphabet vice-president and sales manager, and M. Black, secretary. Arthur J. Slade, an experienced engineer with a national reputation, is chief engineer, and has given up his offices elsewhere to make his headquarters with this concern at 1600 Broadway.

The vehicles are of Mr. Slade's design, and comprise 1, 2, 3.5 and 5-ton capacities. On these new motors recently developed by the General Electric Company will be used, these incorporating a number of distinct improvements. A temporary factory has been secured at Oraton street and Verona avenue, Newark, and here the vehicles will be constructed until a larger plant is built. The first car has been in use more than 7 months and has given a good account of itself.

The Atlantic Company is incorporated under New Jersey laws for $300,000..

BUFFALO'S MILLION DOLLAR CONCERN

Buffalo, April 18.—In the Buffalo Electric Vehicle Company of this city, recently incorporated at Albany for $1,000,000, of which $700,000 is to be common stock and the balance preferred, there is seen the working out of the modern tendency toward consolidation. The incorporators of this company were W. C. Feuchter, W. J. P. Seipp, Thomas B. Wheeler, Frank G. Lane and Marcus A. Alexander, all Buffalo men and all unknown in the automobile industry.

It is thought here that these are dummies covering the real interests back of the big deal until the proper time comes to uncover. It is thought that this deal includes a combination of some five Buffalo firms, two now in the automobile and commercial vehicle business, and the others in closely allied lines. In the former connection the Denniston and Babcock companies are mentioned, both of whom have been producing electric vehicles, the latter for 10 years or more. The new company is to manufacture electric commercial and pleasure cars, but it is understood that the business vehicles will be given the greater prominence.

NEW CAPITAL IN VICTOR COMPANY

Buffalo, April 17.—As a result of a partial reorganization, which includes several new men and considerable new capital, the Victor Motor Truck Company of this city, which has recently moved into a new factory, will follow out a broader policy and cut a much bigger figure in the industry.

Orson E. Yeager, head of the Buffalo Chamber of Commerce, and a wealthy lumberman, has become interested and was elected president of the concern. It is said that other changes are possible in the near future, but for the present Olin L. Neal will remain as vice-president and James G. Budd as general manager. Special attention will be devoted to the further development of fire and other municipal apparatus.

SURVEY BOARD PLANS FUTURE CITY

Philadelphia, April 15.—Although the streets of this city are considered well planned and fairly wide, owners of commercial vehicles are finding them very congested and are not realizing the full measure of speed savings for this reason. These users will be interested in the new plans of Chief G. S. Webster, of the Bureau of Surveys, who predicts a population of 3,000,000 in 1930, and wants to work out a comprehensive city business plan to deal with the congestion.

FERRY SERVICE HELPS TRUCKS

Wilmington, Del., April 13.—Motor truck deliveries from Wilmington stores to New Jersey customers will be possible when the New Jersey & Wilmington Ferry Co. completes improvements now in progress. The company will make a strong bid for motor vehicle business, the boats being of a size to handle from six to seven at a time. The recent modification of the Jersey laws has given merchants here a powerful incentive to go after this trade and with co-operation on the part of the ferry company they propose to do so.

QUEBEC TO REGULATE TAXICABS

Quebec, April 22—An amendment has been passed by the Legislature which will give the city the right to make by-laws controlling chauffeurs of automobiles and taxicabs kept for hire, as cabmen are now controlled, and to inspect the meters in taxicabs. It will also make it possible to establish a fine for passengers in these vehicles who do not pay the regular fare, the standard for which will be set. This has not been possible hitherto.

ENGINE FIRM TO BUILD IN PITTSBURGH

Peru, Ind., April 8—The Model Gas Engine Works, of this city, well-known maker of motors for commercial vehicles, has announced the purchase of land near Pittsburgh, on which a very large factory will be built and operated as a branch of the plant here. At the same time $300,000 has been invested in the company by Pittsburgh men, some of whom will be elected to the board of directors. E. A. Meyers will remain as general manager.

SOLID TIRE PRICES UNCHANGED

New York City, April 23.—Following the recent announcements by the various tire companies that the price of their products had been reduced materially to both user and dealer, the Commercial Vehicle is authorized to state that these changes do not apply to the price of solid rubber tires. The latter is unchanged; in fact, it was intimated that any alteration whatever would be upward.

ENGINEERS WILL GO TO DETROIT

New York City, April 24.—Detroit has been chosen as the meeting place for the annual summer meeting of the Society of Automobile Engineers. The dates set are June 27, 28 and 29, and the official headquarters will be at the Hotel Ponchartrain. A large local committee has been appointed to look after the program of entertainment and sightseeing. A large attendance is expected.

HORSE CABS OBSOLETE IN BERLIN

Berlin, April 4—Since April first the horse cab has been invisible in this city, the Chief of Police having ordered their elimination effective on that date. The equivalent of $150 will be paid the superseded drivers and they will be given preference in granting motorcab licenses.

Commercial Car Questions Discussed

Cause of Backfiring and Its Remedy

EDITOR COMMERCIAL VEHICLE:

(23)—What is the cause of backfiring into the intake manifold and carburetor, and how can it be remedied? I have been troubled with this many times and cannot seem to find the cause of it nor a good cure.

Metuchen, N. J. L. R. DAVIS.

There are three principal causes of backfiring into the carburetor; a bad mixture, improper seating of valves and a defective ignition system. Eighty per cent. of the causes of this trouble are due to a weak mixture caused by improper carburetor adjustment, i. e., too much air or too little gasoline. Another cause of weak mixture which leads to backfiring into the carburetor is a bad flow from the tank to the float chamber of the carburetor, due to an airlock in the piping, a closed vent in the gasoline tank, or a gasket in the gasoline pipe line which has been squeezed into the pipe when the union nut was tightened. A weak mixture is also very commonly caused by a leaky gasket in the intake manifold connections. Air is sucked through this leak and rarifies the mixture to such an extent that the backfiring into the carburetor is a natural consequence.

The second cause of backfiring into the carburetor is a defective intake valve seating. The valve itself might not be defective, a flake of carbon on the valve seat will hold it open and allow flame to penetrate into the intake and fire the gases in the manifold and carburetor. A warped or pitted valve will give the same results. If the valves are warped or pitted they should be renewed as either of these conditions bespeak poor material and grinding is no cure. The valve adjustment itself may have been made without allowing for the expansion of the valve stem when the motor is warm. The valve is thus held off its seat by the adjustment nut. A visiting card forms a very reliable gauge to test the distance between the valve stem and tappet when the motor is cold. The adjustment should not be made so tight that the card cannot be slipped between the tappet and stem when the cam is now lifting the valve.

The third cause is rare. Weak batteries will give the trouble occasionally and there will sometimes be a ground in the high tension circuit which will give a spark at the wrong time, perhaps exploding the charge just as it is entering. Look for this last.

A Question for Truck Salesmen

Editor COMMERCIAL VEHICLE:

(24)—Which is the more important to present to a prospective buyer of motor trucks, saving in haulage expense or quality of service?

Boston. SALESMAN.

This is a question which the motor vehicle salesman would give a different answer to in each different case. In the case of a department store, without a doubt the quality of service would be the important item, although the saving effected by the vehicles would not be overlooked by any means. In the case of a contractor desiring the truck for hauling brick, sand or gravel, it is doubtful if anything which could be said on the subject of service would carry the slightest weight. What this type of man would be interested in would be the saving in money first and in time, after that.

No business house or prospective buyer of commercial cars will ever lose sight entirely of the cost, hence it would seem to be a fair rule to consider the saving in haulage expense in every instance, making the quality of service prominent only in those few cases, like the one cited, where this is liable to be the determining factor.

Applying Split Pins Correctly

Editor COMMERCIAL VEHICLE:

(25)—To settle an argument among the truck drivers of this company will you state whether there is a right and a wrong method of applying cotter pins or wire in rod connections or on castellated nuts?

Jersey City. A. C. McGUIRE.

The only case in which there is a right and wrong method of applying split pins is that in which the pin may be put in from above or below and the cotter applied on the side opposite the head. In that instance, it is correct to place the head on top and the cotter on the bottom side, as then, even if the latter be shaken out or lost, the through pin will still remain in position because of its own weight.

If the process were reversed, and the head placed at the bottom, so soon as the cotter shook out or was lost, the weight of the through pin would cause it to fall out. The same might be said of castellated nuts on parts which may be put in from either the top or the bottom. For those also, it would be correct to put the head at the top and the nut with its cotter or wire at the bottom, as even if cotter or wire were lost and nut shaken off in addition, the weight of the piece would tend to keep it in the original position.

Where either piece is horizontal or where no choice is offered, there is no correct or incorrect position.

Water in the Carburetor

Editor COMMERCIAL VEHICLE:

(26)—I have heard a lot about water getting into the carburetor and would like to know what the effects of such a happening are and what should be done under the circumstances. I have never had an experience of the kind but wish to know in case water should get into the carburetor of my truck.

Portland, Me. MELVILLE LEWIS.

Water in a considerable quantity getting into a carburetor will start the engine misfiring and it is usually impossible to start. If a small quantity of water gets in, while the motor is running the speed of the engine may be checked only during the time it takes to draw off the water. As soon as this has been done the motor will run at its former speed. On all carburetors there is a small drain cock at the lower part of the float chamber by means of which the water can be drained. Filters are often put in the gasoline line for the purpose of removing water and impurities from the gasoline. They are very practical, work well and require little or no attention.

Advantages of Dual Tires on Light Trucks

Editor COMMERCIAL VEHICLE:

(27)—I have just purchased a 2-ton truck and wish your advice concerning the tires I should use. I have been told that I should use double tires on the rear wheels. I understand that 60 per cent. of the weight carried should fall on the rear part of the frame but the nature of the loads for which my truck is intended make it necessary to carry more than this over the rear wheels. Do you think that double tires are necessary? What advantages have they besides sustaining the weight?

Lexington, Ky. V. T. SOMMERS.

It is generally considered that the greater the amount of rubber the truck runs upon the greater is the economy or the less the tire cost a mile. This accounts for the gradual but persistent increase in the size of truck tires in diameter and cross section. Moreover, it accounts entirely for the very wide present use of dual tires, few of which were in use 4 years ago, even on the heaviest trucks.

The loading has a large influence upon this as well; the smaller the proportion of the load carried on the rear wheels, the smaller those tires may be with safety, and conversely, as the proportion over the rear wheels is increased above the maker's design for which his tires are proportioned, the more care should be taken in the selection of new tires to replace them.

If the maker figured on a certain size to carry 60 per cent. on the rear wheels, and by altering body, load or other items, this is increased to 70, the tires should be changed in proportion. The addition forms a 16.6 per cent. increase, hence it would be well to increase the tires by 20, going from a 5-inch width to a 6. Should the loading be increased further to say 75 per cent. the tires ought to be augmented to present a wearing surface of nearly 30 per cent. more. In this case, dual 3.5 tires would be better than going to an odd size like 6.5 in., in fact it has been proved that in a case of this sort, dual 3-in. tires would give better results than the single very wide unit.

Another point in favor of the dual form is that it is said to give superior traction and lessen skidding on wet and slippery days.

How Carbon Deposits Are Formed

Editor COMMERCIAL VEHICLE:

(28)—While grinding the intake valves on my truck the other day I noticed a grimy and greasy deposit of soot which I have never seen before. From this scant information can you tell what the cause of this deposit is and how it may be remedied?

Sacramento, Cal. JAMES K. BRUCE.

There are several ways in which this deposit may be formed, chief among them being a poor fuel mixture, too much gasoline flowing into the cylinders. Too much oil or a poor quality of oil or gasoline sometimes causes a similar deposit. The piston rings may leak, allowing oil to get into the combustion chamber. Occasionally dust works into the cylinders by way of the air intake of the carburetor. This is quite apt to be the case when the truck has been run a great deal over dusty roads. A piece of screening should be fastened over the air intake. This may be obtained at nearly any garage or supply house.

Lining Up Chains and Sprockets

Editor COMMERCIAL VEHICLE:

(29)—Is there a good way in which the correctness of chains and the lining of sprockets can be checked up and then changed, if found wrong? What difference would it make in the running of the car if the chain did not run true and straight and what difference to the chains and sprockets?

Brooklyn. M. J. JACKS.

The attached sketch, Fig. 1, shows the two vertical and horizontal planes, in both of which the chains must show correct alignment. If it does not the chains will be noisy and wear out quickly, and the sprockets as well. There is the possibility that a tight and crooked running chain may pull either axle or countershaft out of line, with consequent additional damage to the tires and bearings.

To test the correctness of a chain in this respect remove it and test the sprockets, as the chain can only run on the surfaces provided for it, in this case the surfaces of the sprockets. In the side view of Fig. 1 determine the two lines A-B and C-D by placing straight edges along the members. This will tell by the parallelism of the straight edges whether either sprocket must be moved in a vertical plane to restore correctness. Then prove them out as in the plan view of the same figure, this determining whether either sprocket must be moved in a horizontal plane. In both instances prove, in addition, the parallelism to the frame of the driving sprocket or lack of it.

If the driving sprocket be found parallel to the frame, and as great a difference relatively as is shown at the left, this means that the left-hand end of the axle must be pushed back by means of the radius rod a very large amount to restore correctness to the combination. If no error be found in the horizontal plane, as outlined at the right, this will be sufficient to cure all troubles or excessive wear, but if an error be found there, particularly after the axle has been shoved back enough to correct in the other plane, the probabilities are that the axle is bent. This is, of course, provided the sprocket is parallel to the frame in that plane, too. In this case, the manufacturer or his representative should be appealed to for help, as it is too big a job for an amateur.

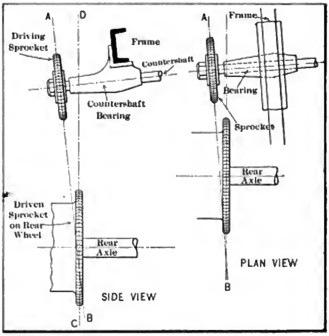
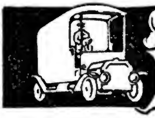


Fig. 1—Diagram Showing the Two Planes in Which Sprockets Must Be Lined Up and the Possible Lack of Alignment



The TRUCK MAKER'S MARKET

THE three developments of the month in the municipal motor-driven apparatus line were the conversion of several cities, notably in the far West and South, to the all-motor-no-horse fire department plan, the decision of an Eastern city to buy fire truck service at a flat rate rather than purchase, and the Pennsylvania decision that all municipal apparatus is entitled to a State license tag free.

Relative to the first, the fire commission in Los Angeles asked for $1,000,000 in round figures, approximately half of which is to be used for purchasing motor-driven apparatus. The cars asked for immediately are as follows: Six pumping engines, three service trucks, several chemicals and others. One point which was brought out in this commission's report is that the rapidity of motors is necessitating quicker and better alarm systems.

In San Francisco, the Board of Supervisors reported the ambitious program of motorizing the entire department by 1915. For this purpose an appropriation of over $2,600,000 was asked for, of which $1,100,000 is for new motors.

Alameda, Cal., with but 26,000 population, wants a motorized department also, and the fire chief there has compiled figures to show that much money would be saved the taxpayers after the initial expense of purchase. The department's horse-drawn pieces average better than $42 a month, while the one motor now owned has cost but $3 a month for the past 6 months, exclusive of salaries and overhead charges. His plan is for eight new chassis and two tractors, with which all the present horse apparatus can be utilized.

In Birmingham, Ala., Chief Bennett plans to save the department $2204 a year for feed and horse keep alone by placing a motor tractor in front of each of the eight engines now handled by horses. He plans to motorize the entire department in a short time in this way.

In Franklin, N. H., a radical departure is noted, the fire department committee there having agreed to contract with a local firm to furnish the service of a motor-driven vehicle at a flat rate a month. The figure agreed upon, $1100 a year, would be at the rate of slightly more than $91 a month, extremely high in view of the low cost of operating motor apparatus, but on the other hand the city is freed entirely of the initial outlay, upkeep, troubles, etc.

By a decision of the deputy attorney general of the state, Franklin, Pa., will obtain from the highway department free license tags for its motor-driven municipal apparatus. The ruling is that all motor apparatus owned by boroughs or townships and under the control of such municipalities shall be granted registration and license tags at all times by the state free of charge. This raises a very interesting point and one that will be watched closely in other states.

Chief McCan, Stockton, Cal., has asked for an appropriation with which to buy a motor-driven fire engine, combination hose and chemical and chemical engine.

Hollywood, Cal., has decided to purchase a motor-driven fire engine.

Las Cruces, N. M., has appropriated $3,000 for a motor-driven combination chemical and hose wagon for its volunteer department.

Tonopah, Nev., county commissioners are considering the purchase of a fire truck, on which a saving of $750 a year is estimated.

Eugene, Ore., has ordered a chemical and ladder combination to cost about $8,000.

The fire committee of La Grande, Ore., has decided upon an American La France motor as a result of an investigation and has so reported to the town council.

The Department of Public Service, Los Angeles, closed bids for 2-ton truck early in April.

The Sewerage and Water Board, New Orleans, opened bids for three light automobiles early in April and at the same time advertised its horses and mules for sale.

The town corporation at Mermentau, La., is contemplating the purchase of a motor-driven fire engine for a department which is to be organized.

Deland, Fla., is considering the purchase of a motor for its fire department.

Abilene, Tex., will vote May 6 upon a proposed bond issue which includes $10,000 for motor-driven fire apparatus.

Grand Saline, Tex., has purchased and received a new fire truck.

Trinidad, Col., is to have a Seagrave combination hose and chemical.

The fire committee of the Macon, Ga., council is considering the purchase of another piece of motor-driven apparatus.

Waycross, Ga., has received its first piece of motor apparatus.

Sioux City, Ia., has accepted the bid of the Robinson company, St. Louis, for a motor fire engine.

Moundsville, W. Va., has received its combination hose and chemical.

Following a recent fire, in going to which it was necessary for the horses to rest several times, St. Joseph, Mo., has decided to purchase motor-driven apparatus.

On April 2 the voters of Oak Park, Ill., decided to purchase a motor patrol for $3,000.

Minneapolis will have eight pieces of motor apparatus by July, contracts for two additional hose carts and two chemical combinations having been approved.

St. Paul is discussing the purchase of a motor fire engine. The fire board has not arrived at a decision as yet.

Wilmington, Del., is about to limit the speed of its motor apparatus to 20 miles an hour, following considerable reckless driving.

Police Commissioner Waldo, New York City, has placed an order with the Garford agents for three police patrols. It is his plan to replace gradually all horses in this service and by combining the service of several precincts to reduce the total number of vehicles to one-third.

When the New York fire department bids were opened early in April for 26 second-size combination chemical and hose wagons, three high-pressure vehicles and two first-size hose wagons, the R & I. Company was lowest in all but the last named. In this, the International Motor Company was low and was awarded the contract. Action on the other contracts was deferred. The bids were as follows:

Bidders.	26 2d size wagons.	3 H. P. wagons.	2 1st size wagons.
R & I. Company	$96,122	$14,220	$9,480
International Motor Company (Mack)	102,570	14,625	8,326
Robinson Fire Apparatus Company	108,628	.....	....
American La France Company	108,940	.....	....
Knox Motor Car Company	116,803	14,817	9,214
Knox Motor Car Company	114,000	14,592	9,060
Seagrave Motor Car Company	123,474	14,955	9,130
Webb Fire Apparatus Company	123,500	15,757	9,000
White Auto Company	138,606	15,357	10,166

Twenty-one new fire houses are being built in the suburbs and the new vehicles will be installed in these. The specifications called for a higher speed for this suburban use than is usual.

On April 19 Paterson, N. J., closed the bids on a pumping engine to carry 1200 feet of hose and a 50-gallon chemical tank. Earlier in the month the contracts were awarded for an additional police patrol and a fire chief's vehicle.

In speaking for an appropriation of $2,000 to buy a motor-driven combination police patrol and ambulance, Commissioner J. H. Kehoe, Passaic, N. J., gave as his opinion that this machine would pay for itself in 4 years by means of an annual saving of nearly $700. In support of this he advanced the following figures on the horses and estimate on the motor:

Salary to patrol wagon, a year	$780.00
Salary to ambulance services, a year	251.00
Constable fees, a year	170.00
Total a year, rented horse methods	$1,201.00
Interest on motor, 4.5 per cent. on $2,000	$90.00
Amortization at 15 per cent	300.00
Maintenance and repairs	150.00
Total for the automobile	$540.00
Making an annual saving over the present of	$661.00

No charge for a driver is made because the plan includes transferring one of the policemen to this work. The City Commissioners passed a resolution authorizing the expenditure of the $2,000 for this purpose.

The Buroogh of Edgewater, N. J., is seeking bids on a complete equipment of motor fire apparatus.

Summit, N. J., has placed a contract with the American-La France company for a triple combination pump, chemical and hose wagon, and a chemical combination with two 35-gallon tanks and capacity for 1000 feet of hose.

The City Engineer of Ottawa, Ont., has submitted prices to the Board of Control in that city on motor-driven garbage wagons and has recommended the purchase of a motor-driven street sprinkler.

On April 15 the fire department of Washington, D. C., opened bids for a two-passenger motor car for the deputy chief engineer. About July 1 this department will be in the market for the following pieces: Four-passenger chief's car, motor truck and combination chemical hose and pump.

Arlington, Mass., recently made an appropriation of $8,000 for a combination fire pump, chemical and hose truck.

Early in April the Pittsburgh municipal department opened bids for 15 additional motor-driven pieces of apparatus as follows: Six automobile patrols, five combination chemical and hose wagons, two police runabouts and two tractors for the fire department. The awards have not been made as yet.

Through the efforts of the Committee on Municipal Affairs of the Board of Trade, the Philadelphia fire department will be equipped with several pieces of motor-driven apparatus within the next 6 months.

The volunteer fire department of Freedom, Pa., has decided to buy a high-powered chemical and hose wagon. A committee has been appointed with power to act and $5,500 appropriated.

Evansville, Ind., has decided to purchase a motor patrol wagon and a combination chemical and hose. This decision was made by the Board of Public Safety April 5.

Newcastle, Ind., is in the market for a motor-driven fire truck.

Akron, O., is in the market for a fire pump, $8,500 having been appropriated early in April for this purpose.

An ordinance has been passed in Columbus, O., providing for the issue of $50,000 worth of bonds with which to purchase motor-driven fire apparatus.

Cincinnati plans to spend upward of $250,000 improving its fire-fighting facilities, most of this being expended for motor-driven apparatus.

Canton, O., is now in the market for about 10 motor-driven fire vehicles, the bond issue of $70,000 for this purpose having been passed.

A bond issue just authorized by Canton, O., carries $25,000 for three combination fire vehicles, a police patrol and a fire chief's runabout.

Bids closed in Columbus, O., April 22 for a five-passenger touring car for the police department and a two-passenger roadster for the fire department.

Due to the large increase in the city's area, Chief Lauer, of Columbus, O., wants considerably more motor fire apparatus. With a small amount of the latter, the area will be covered better and a large reduction made in the department's operating cost. The sum of $50,000 is now available and with this at least 10 pieces will be purchased immediately.

Temple, Tex., is about to issue $35,000 in bonds to buy motor fire apparatus.

Dallas, Tex., is considering the purchase of a motor-driven hook and ladder truck, and Fire Chief Magee is touring the South and Middle West investigating the matter and seeing the equipment of other cities.

Bids are being asked by the commissioners of Marion County at Indianapolis for a light gasoline truck to cost not to exceed $1000. This is to be used by the county bridge carpenters for carrying their tools to and from their work, which extends all over the county.

The Council of Racine, Wis., has authorized the purchase of three motor fire engines.

Bids will be received up to May 14 by the Shreveport, La., fire department for one motor combination chemical hose wagon, two motor combination pumping engine and hose wagons, one tractor and one chief's cars.

Richmond, Ind., will have its motor-driven fire truck by the first of June.

Bonds were voted on for $10,000 in Selma, Cal., for the purchase of motor-driven apparatus.

The Charleston, S. C., fire department awarded the contract for building an 80-horsepower combination chemical engine and tractor to the Seagrave Company.

The new motor fire engine has arrived at Nashville, Tenn., which is to be tested, and if satisfactory will be purchased.

Winnsboro, S. C., has decided to purchase a chemical engine.

Sterling, Ill., is considering the purchase of a motor fire truck.

Fire Chief Schneider of the Riverside, Cal., fire department has word that the two 80-horsepower motor chemical engines may be expected May 1.

Fire Chief Clifford, Pasadena, Cal., recommended that motor-driven fire apparatus be purchased, and asked for an appropriation aggregating $70,800 be made.

Many Commercial Vehicles in Winnipeg

WINNIPEG, March 15.—Winnipeg is the most northerly city on the American continent with population of over 100,000, but despite that fact and despite the fact that the winters are usually long and trying both on man and beast, the commercial vehicle is coming into use rapidly.

Winnipeg has three large departmental stores, all of which are using motor trucks for delivery. The manager for the T. Eaton Co., Ltd., the largest of these stores, says that the business now could hardly be carried on without the vehicles. This store is one of the largest in the Dominion and employs over 4,000 people. The Eatons have four motors and so far this winter have used them every day even on the most distant suburban routes. Of course, the snowfall this winter has been light, but for about a month it was very cold.

The *Manitoba Free Press*, the leading paper of Western Canada, has two Gramm delivery wagons and these are found to be of very great service in hastening the editions out to the suburban depots for the carrier boys and thus getting the news quickly to the homes of the people. The wagons are also almost indispensable in hurrying papers to the railway depots for trains going out into the country.

The cars now in use here are as follows:

Firm		Make and capacity of car
T. Eaton Co., Ltd.	3	White, 1 Chambers
Hudson Bay Co. (Furs)	2	
T. Robinson Co. (Dept. Store)	2	
Ashdown Hardware Co.	5	
E. L. Drewery (Brewery)	1	Kelly 1-ton
Manitoba Free Press	2	Gramm 1-ton
Canadian Northern R. R.	3	Argyll 3 ton
Canadian Pacific R. R.	1	Packard 3-ton
Rogers Fruit Co.	1	Franklin 1-ton
Manitoba Gov't Telephone	1	Sampson 4-ton
Gordon, Ironsides & Fares	1	Gramm 1-ton
Dingle & Stewart (commission)	1	Reo ¾-ton
A. McDonald Co. (Wh. Grocers)	1	Lorimer 1-ton
Winnipeg Paint & Glass Co.	1	Lorimer 1-ton
J. Leslie Furniture Co.	1	Lorimer 1-ton
A. H. Stolper (Greenhouse)	1	Brush 500-pound
G. Cronbach (Butcher)	1	Brush 500-pound
Morris Dye Works	1	Brush 500-pound
Jessie & John, the Cleaners	1	Brush 500-pound
Gibson Gage Co (Butchers)	1	Brush 500-pound
C. L. Charret (Butcher)	1	Brush 500-pound
Westing Packing Co.	1	Brush 500-pound
Mackintosh, Vick & Co.	1	Brush 500-pound
Maple Leaf Renovating Co.	1	Brush 500-pound
Red River Metal Co.	1	Brush 500-pound
Dominion Bridge Co.	1	Brush 500-pound

Out in the small cities and the towns of the vast Canadian prairie the commercial vehicle is being used in a few instances, but it is a foregone conclusion that it soon will be used extensively. In the town of Neepawa an enterprising young butcher had a rack built on the back of a Brush runabout and uses the wagon for delivery around the town. He also, in the summer season, takes fresh meat right to the doors of the farmers.

Altogether about 70 commercial vehicles have been sold by dealers in Winnipeg. This is of course outside the very much greater number of farm tractors which have been sold and now are extensively used for plowing, cultivating and other forms of agricultural work.

N. Y. CENSUS COVERS MANUFACTURERS

WASHINGTON, April 22.—The Bureau of Census of the Department of Commerce and Labor has published Tables 1 and 2 which will constitute the main part of the bulletin of manufactures for the State of New York as shown by the thirteenth census. This is in four parts, the first of which gives a comparative summary of all combined and selected industries for the state, the second the same for cities of 50,000 inhabitants and more, the third a summary of all industries combined for cities with less than 50,000 population and the fourth a detailed statement of the state by industries for 1909. In this it is noted that the automobile and motor truck industry (they are combined) stands very high. The figures are:

No. of establishments	N. Y. Rank 56
Persons engaged	N. Y. Rank 21
Horsepower used	N. Y. Rank 39
Capital invested	N. Y. Rank 25
Salaries paid	N. Y. Rank 23
Wages paid	N. Y. Rank 16

System Used in Largest Detroit Garage

Method of Handling Commercial Cars in What Is Claimed to Be the Largest Garage in the World, Occupying a 10-Story Building in the Heart of Detroit—Methods of Keeping Data—Blank Forms Used

IN what is claimed to be the largest garage in the world, the Murphy Power Company, Detroit, is operating a commercial car service station which is doing much to advance power vehicle sales in the Michigan city. When the present alterations have been completed, the building will house no less than 600 cars. This structure is 10 stories high and occupies the corner of Congress and Wayne streets, a very advantageous location in the heart of the wholesale business district and convenient to the big department stores, thus making it available for all classes of commercial vehicles.

The whole building measures 225 feet along Congress by 120 feet deep on Wayne, but this is divided into two parts, one 150 by 120, of which the garage has all 10 floors, and the other 75 by 120, in which only the upper five stories are devoted to commercial car uses, access to these being had from the upper floors of the first part. This gives a total floor area of 225,000 square feet. The larger portion fronts on an alley in addition, so that the building has the same as three street frontages. There is an entrance on the alley as well as several into the larger part of the building on Congress street.

As to the division of space, the ground floor is occupied by the power plant in the Congress street and alley corner, the entrances, the elevators, the washing bays and the office of superintendent and accounting clerk. The general division of cars is light vehicles to the upper floors above the fifth, and heavy to the lower. To facilitate running the establishment on a close time schedule, the heavy ones are washed on the ground floor, but the lighter cars are carried up to the fifth, where there is another washing bay. In the latter instance, it was figured as the storage of these cars began above that floor the washing could be handled at that point to a better advantage than trying to do all on the ground floor with much resultant congestion. Each washing bay is capable of handling 20 cars, so that the seven, three on the ground floor and four on the fifth, can wash a total of 140 cars a day. With the present number of patrons, this is sufficient capacity to care for all, as the majority of cars are washed only every other day. Present plans include more washing space. The switchboard is on the third floor.

Going on up, the eighth floor is given over to the general offices. Here is the accounting department where data is prepared, three men being kept busy on this item alone. At present, attention is confined to the collection of statistics relating to the economy of operation of electric vehicles since the company generates power for general sale, and in the natural order of things is looking for outside customers as well as the convenience of those within. Here, too, are sent the check sheets, cards and other blank forms from the clerk on the ground floor, as well as from the many inspectors all over the building.

The tenth floor is the location of the repair shop, which has 6,000 square feet of space there. At present, it handles work for both gasoline and electric cars, but eventually there will be a separate department for each, the layout being such as to make this a natural development. There are charging stations for electric cars on every floor.

The division of cars at present is approximately as follows: Gasoline commercial, 30 per cent.; electric commercial, 30 per cent.; gasoline pleasure, 20 per cent., and electric pleasure, the other 20. It is expected, however, as the commercial vehicle industry expands, that this form will supplant the pleasure cars now kept there, not alone because the building is advantageously situated in the business district, but also because it is somewhat poorly located relative to the residence section.

The electric and gasoline cars are kept on separate floors to facilitate inspection and repair work. So far as is possible, the various makes are kept separate also. This facilitates the work, uses the space to better advantage, and, in addition, lessens the lost time of the workmen traveling from car to car.

In as high a building as this, the elevators are of great importance. There are two of these now in use and two more being constructed. They measure 10 by 20 feet in size, and have a capacity of 5 tons each, so that the largest trucks may be handled. In addition, they are high speed elevators, 50 seconds for the trip from ground to tenth floor being possible. They are well located, one at the east side of the building, close to the Congress street entrances, the other on the west side directly opposite the alley entrance.

The personnel of the company is interesting. The president is William H. Murphy, who had sufficient faith in the future of the commercial car to develop this garage from one of the most modern storage warehouses in the country. C. Hayward Murphy, a well-known Detroit business man and secretary-treasurer of the Power Company, is general manager of the garage department, while the practical end of the business is cared for by W. J. Burns, superintendent, who has been identified with the electric vehicle and automobile industry from its inception. The total number of men employed is 30.

Monthly Charges for the Service

Charges for electric cars are graded according to capacity, the rates by the month for a 1000-pound vehicle being $45; 2000-pound, $50; 4000-pound, $55; 10,000-pound, $60. This includes washing, polishing and recharging battery, besides storage room work, repair charges being additional. In the case of daily battery charge that exceeds the ampere-hour rating of the battery of car, current so used is charged at the rate of 4 cents a kilowatt-hour, approximately the figure used in other cities.

With gasoline cars, complete storage ranges from $29 a month for an 800-pound vehicle and $30 for a 1200-pound truck, up to $40 for a 5-ton truck. This includes washing, polishing, oiling, filling grease cups, grease in differential, and cleaning outside engine parts. It does not include lubricating oil or gasoline.

Over and above the simple rendering of service paid for, the company is vitally interested in pointing out to both manufacturer and user comparisons between different types and sizes of trucks, as well as data for its own purposes. In this respect, as in several others, the Murphy company differs from the common run of garages, for it has assumed the functions not only of caretaker, but collector of data on operation and cost. This is obtained primarily for the enlightenment of the Murphy concern, so that it may increase the standard of efficiency wherever possible. But this information is not only always available to interested parties; owners of machines at frequent intervals are put in possession of facts regarding their delivery systems that awaken an interest which proves mutually beneficial and valuable.

A feature that is being pushed extensively, and which is proving popular, is known as in-and-out service, it being an adaptation of the *a la carte* idea. For $10 a month storage space is furnished. This gives the lessee absolute control of any or all his cars, day or night, and the use of the garage repair shop at any time to make necessary adjustments and repairs, including the use of bench, vise and other fixtures. Permission is granted to install a receptacle for the storage of lubricating oil and transmission grease, but storage of gasoline is not permitted. The cost of a wash and polish is $1 a car, except in the case of smaller machines, where a reduction is made. The company furnishes gasoline to patrons who may desire, and charges at the current market price, with no attempt to make a big profit.

The Blank Forms Used

When a transient car enters the garage a tag (1, Fig. 1) is attached by the man who takes charge, and remains on the car until it is called for, it being necessary to present the stub shown at the bottom at the garage office before the car can be obtained. This tag carries the date,

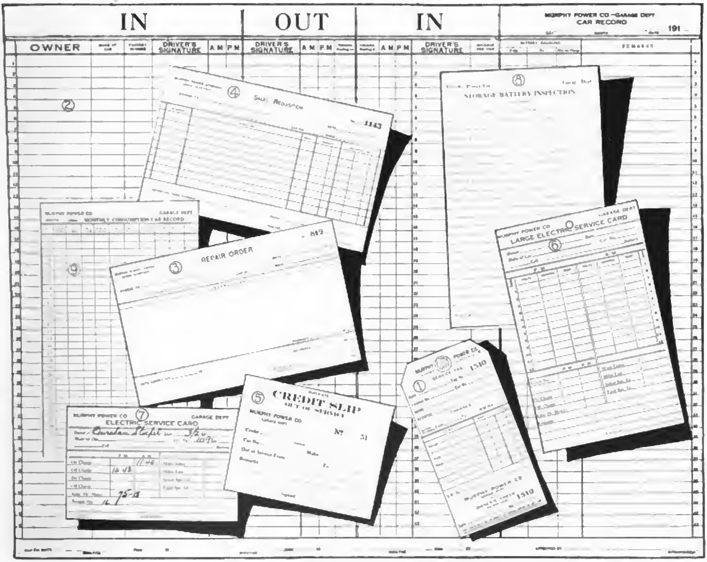


Fig. 1—A Group of the Blank Forms Utilized in the Murphy Power Company's Garage in Detroit. These Are: 1, the Service Tag Attached to Cars as They Enter; 2 (background), Sheet Used for Keeping Track of In and Out Movements of the Cars; 3, Repair Order Blank; 4, Sales Requisition Form; 5, Credit Slip for Lost Time; 6, Employees' Electric Service Card; 7, Inspector's Service Record; 8, Battery Inspection Record; and 9, Monthly Summary of Current Consumption

license number, car number, name of owner, address, and has space in which to enter battery or other charges, each item being kept separate, and the statement being shown when the car is called for.

With regular machines a duplicate sheet (2, Fig. 1) is posted just outside the office, and the driver must check out and in here in spaces provided for the purpose. To guard against confusion, the make of car and factory number are entered, in addition to the name of the owner. The time is recorded when the car leaves and returns. The odometer is read out and in; a complete showing being thus made each day of the car's performance. One of these sheets goes to the office, and from the other are compiled statistics whereby it is possible to ascertain at a glance what a given car has accomplished any day or month. On a daily mileage card (Fig. 4) the distance traversed is entered so that comparisons are available constantly.

This information is constantly accessible, and where it appears that good results are not being obtained, the owner's attention is called to the fact, with suggestions as to a betterment of conditions. In one case, this resulted in a decrease of 20 per cent. in running time and an increase of 25 per cent. in mileage.

When a machine enters the garage it is taken in charge, after its arrival has been noted on the sheet, and run to one of the washing bays. After being washed, it is gone over by an inspector to see that everything is in good condition, and he reports on its condition. As a matter of course, it is up to the driver to keep track of his machine and make a special report on needed adjustments or repairs. But dependence is not placed entirely upon him, and by means of the garage inspection a double check is maintained that assists materially in preventing trouble. Cars are inspected on the various floors to which they are assigned, with the exception of those reported by the drivers to be in need of immediate attention. The inspectors are held responsible by the foreman on duty, and he in turn has to answer to the superintendent, this centralization of authority proving very satisfactory.

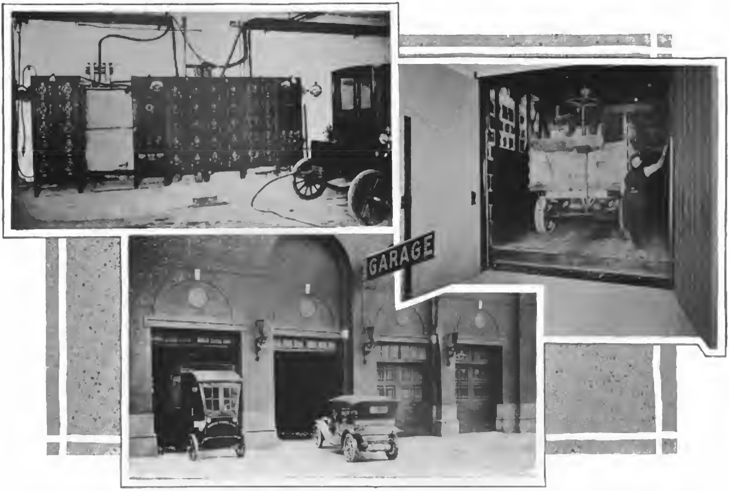
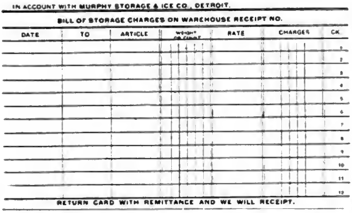


Fig. 2—View of the Largest Garage; Below, the Entrances on Congress Street; Above at Left, One of the Charging Panels with a Car on Charge, and Above at Right, One of the Huge Elevators with 5-Ton Truck on It to Show the Size

Repair charges are over and above storage rates, but precautions are taken to see that there is no overcharging. Many prices are fixed, as patching tubes or repairing shoes, changing tires or rims, common machine work, etc. Repair work is charged at 75 cents an hour, the time being recorded by an electric clock upon the face of the repair order (3, Fig. 1). This may be made out by driver or inspector and contains written instructions to the shop men. It is made out in duplicate, the original, which is filed in the superintendent's office, having upon its reverse side (Fig. 5) a complete record of the time and cost of the work. For purchases, either new parts or others, a sales requisition form (4, Fig. 1) is used.



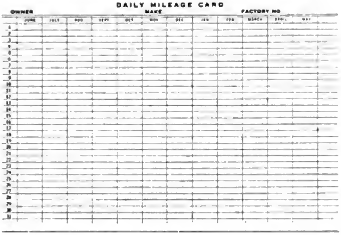
IN ACCOUNT WITH MURPHY STORAGE & ICE CO., DETROIT.

BILL OF STORAGE CHARGES ON WAREHOUSE RECEIPT NO.

DATE	TO	ARTICLE	WEIGHT	RATE	CHARGES	CK
						1
						2
						3
						4
						5
						6
						7
						8
						9
						10
						11
						12

RETURN CARD WITH REMITTANCE AND WE WILL RECEIPT.

Fig. 3—Form of Bill Utilized in the Murphy Garage, Showing Spacee for All of the Different Charges. Note Simplicity of Thie Form



DAILY MILEAGE CARD

OWNER MAKE FACTORY NO

Fig. 4—Daily Mileage Card for Entire Year, Upon Which Daily Differences of Odometer Readings Are Entered

Rebates Made for Lost Time

There is another point worthy of note when the matter of a satisfied customer is under consideration. Each item entering into a complete storage charge is represented by a figure determined after extended experimentation. These in the aggregate constitute what the owner of a machine is required to pay. If a car is out of service for any considerable length of time, even through no fault of the garage, the owner is allowed a rebate for this period. For example, an electric delivery car requires approximately so much current daily. If it is not in operation for a few hours, the consumption of power is reduced accordingly. Here a numbered credit slip (5, Fig. 1) is brought into use, showing the length of time the car was out of service. This is signed by the inspector, turned into the office in duplicate form, and when a bill is rendered at the end of the month charges for this period are deducted, giving the owner a square deal in the broadest sense of the word and one which he is quick to appreciate.

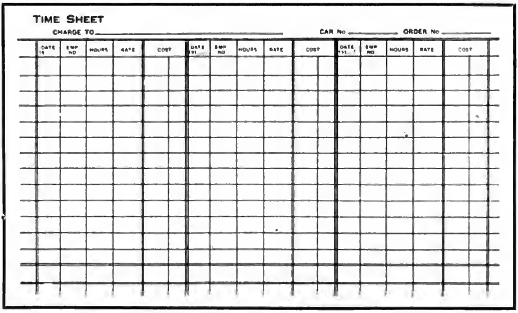
As illustrating the precautions taken to guard against defrauding any of the parties concerned, through collusion of employes, the methods used when recharging electric vehicles command attention. Each floor of the garage is equipped with charging stations, there being 120 all told. A private telephone line leads to it from each floor. An employee having a car whose batteries need recharging calls up the electrical engineer and tells him which station to connect. He does so, and at the same time enters the switch number and the hour upon a large service card (6, Fig. 1,) noting also the time when he receives word to disconnect the station.

The inspector, with a smaller service card (7, Fig. 1) in his possession, has the name of the owner, enters the number of the station, and the time recharging was begun and finished. Both cards are then turned in at the office, and they must correspond as regards the time, on-and-off charge and the ampere-hour meter reading.

Electric power is provided by two 1500-kilowatt Curtis turbines and two 750-kw turbines of the same make, direct connected to 2200-volt a. c. generators, the current being converted through motor generator sets. The switchboard has a capacity of 120 charging stations, with a maximum charging condition of 120 amperes a plug.

Regular and Thorough Inspection a Feature

At stated intervals all cars taking complete storage are gone over thoroughly, in addition to the daily inspection, and any wear or tear that may have taken place is noted and corrected. The attention bestowed on electric vehicles is shown by the storage battery inspection blank (8, Fig. 1), which covers all the essential points involved in this quarter. On the reverse side is a table making provision for 72 cells, the maximum number employed to date in a commercial vehicle, on which are recorded the volts, temperature and gravity of each. These reports are filed, and thus a check is kept on batteries.

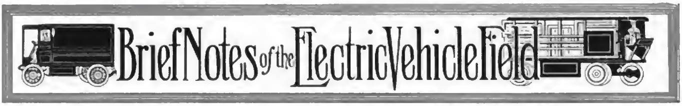


TIME SHEET

CHARGE TO ______ CAR No ______ ORDER No ______

DATE 19	EMP NO	HOURS	RATE	COST	DATE 19	EMP NO	HOURS	RATE	COST	DATE 19	EMP NO	HOURS	RATE	COST

Fig. 5—Reverse Side of Original of Repair Order Shown at 3, Fig. 1, Giving Complete Record of Time and Cost of All Work Done on the Vehicle



Brief Notes of the Electric Vehicle Field

DURING April the two most notable happenings in the electric vehicle world were the sale of a prominent Eastern company to interests identified for many years with the highest grade of gasoline cars of the heavier sizes and additional large sales to express companies, at the time the largest owners in point of total numbers and in magnitude of the individual fleets in the country. The former refers to the purchase by John M. Mack and his associates of the Lansden Company from Thomas Edison and his associates. Mr. Mack has been the active head of Mack Brothers since the inception of that concern, and until very recently was vice-president of the International Motors Company, which absorbed the Mack outfit. This will be found on page 24.

The latest electric express sale, mentioned in detail herewith, was that of 12 Bakers to the Westcott company, adding one to the many large express fleets of the country. It is gradually being recognized as a fact in the industry that the express companies, although owning collectively more than 700 trucks, represent the best field for quick returns at this time. At the recent shows, express and transfer companies were sixth in point of number of inquiries.

American Express Uses Many Electrics

The illustration on this page shows one-third of the electric trucks used by the American Express Company in New York City. These are Bakers and are mainly of 2 and 4 tons capacity.

Express and Light Companies Buy Bakers

An order for 12 2-ton express trucks for the Westcott Express Company, New York City, has just been filled by the Baker company. These are of the regulation form, and somewhat similar to the large number owned by another big express company and operated mainly in the Metropolis. The driver is located on the left side, a notable point.

Large Mileage Over Bad Roads

During one of the recent unseasonable storms, practically a blizzard, a 3-ton G M C electric truck was driven from Pontiac to Detroit over snow-covered roads, carrying a full load and running within 20 per cent. of its full rated mileage.

No Delays for Trouble in Government Service

The officials of the Government arsenal at Rock Island, Ill., report that the 2000-pound Detroit-Electric wagon which it has owned for more than a year, has been in active service every day and has not given a particle of trouble nor experienced a single delay through road or other conditions.

This car has been traveling long distances daily between the various government offices in Rock Island and Davenport as well as in the adjacent part of both Illinois and Iowa, working up to as high as 65 miles on a charge. It is used in hauling considerable mail.

Department Store's Excellent Record

On the pages of this department in the December issue there were shown two views of the vehicles which have just been put into service by one of the largest department stores in Cleveland, Halle Brothers.

During the first month, the six trucks worked 25 days, averaging 36 miles and 164 packages each a day. On this basis, the cost a package was 4.03 cents. This was a normal season and deliveries were somewhat light, but the next month included the holiday rush and the totals went up. During the second month, the vehicles worked 26 days including some Sundays but excluding Christ-

Part of the Large Fleet of Baker Electric Trucks Now Used by the American Express Company in New York City and Elsewhere

mas. They averaged 35 miles and 247 packages a day, 51 per cent. more packages with a lessened mileage. Naturally, this lowered the cost to 2.7 cents a package. Considering that department store deliveries are usually figured at an average of 6 cents or more a package, both months show a material economy.

Low Charging Rates Favor Electrics.

One thing which is being brought to the attention of electric vehicle manufacturers and users is the influence which low charging rates and good facilities have upon the utility of the vehicle, and consequently the amount and character of future business to be done. In this connection it is interesting to note that Winnipeg, Can., has an extremely low rate and should be an excellent field. The municipal plant recently opened charges for house service on the basis of three cents a kilowatt-hour. On this basis the charge for garage and charging current should be slightly less than 2.8 cents, if the relative scale in other cities is duplicated.

In a recent speech on this subject an electric vehicle engineer is quoted as saying the fact that ultimately 65 per cent. of the whole number of vehicles will be electrics justifies the central stations in promoting actively the introduction of electric vehicles. Continuing, he commented on the situation as follows, all this being said with the idea of justifying increased activity on the part of central station men:

> There is no especially good reason why cities of 50,000 inhabitants or more should not present a fertile field for the sale of electric vehicles in competition with gasoline machines, in that such communities represent the hub of a business area whose road transportation is principally confined within the city limits, while the bulk of the suburban delivery is well within the economic zone of operation of an electrically driven machine.
>
> That the central stations are fully alive to the situation is evidenced by their present activity, which needs but an equivalent co-operation on the part of vehicle manufacturers to precipitate an unprecedented electric vehicle boom; and many of us are inspired by the inherent optimism of the electric vehicle promoter to believe that the boom is now at hand.
>
> Many of the obstacles which opposed the early introduction of electric machines have been removed. Excessive rates for current for battery charging are a thing of the past, while "ridiculous first cost," as attacked by some central station managers, is fast becoming a matter of history both through the growth of the industry and the entrance into the manufacturing field of new companies. To just what extent the lighting companies should proceed in the development of the electric vehicle field is a question that each must decide for himself, as conditions are too variable for any universal prearranged programme.
>
> The Union Electric Light & Power Company of St. Louis furnishes an excellent example of the results to be expected from the establishment of garages by the central stations. This company first became interested in electric vehicles in 1907, at which time there were but eleven machines in operation in the city. Subsequently they established two electric vehicle garages, one for pleasure machines with a capacity of 60 and one commercial vehicle garage capable of caring for 75 machines. The number of vehicles now in operation is reported to be 450, and since October, 1910, the number of public electric garages has increased 62.5 per cent, and there are at present over 16 commercial garages.
>
> That the central station co-operation is effectively increasing the number of electric vehicles in operation is manifested by the reports of the vehicle manufacturers themselves, who testify to an unprecedented demand for this type of machine, and there is every indication that the central stations have more than performed their duty in nursing the electric vehicle industry to a state of healthful development. In view of the amount of money expended by the central stations in promoting the use of electric vehicles in many instances their advertising expense far exceeding that of any individual vehicle manufacturer—the sums invested in machines, reduction of electric current rates; the establishment of boosting stations and garages; inspection departments and automobile bureaus of information, it would appear that the manufacturers themselves will soon be hard pressed to care for the business which the central stations are developing, and they may well profit by the example of their gasoline brothers who have honeycombed the country with branches and agencies, salesmen and advertising.
>
> In Boston, Buffalo, Brooklyn, Cleveland, Chicago, Detroit, Philadelphia, Indianapolis, Minneapolis, Newark, New York, Rochester, St. Louis and Springfield, and many other localities, the increase in the number of electric vehicles has been quite marked, in some instances reaching 300 per cent (which, as expressed, may have no particular significance, 1 being 100 per cent of 1), but as the reports from different sections on the number of vehicles in operation vary from 200 to 2000, the aggregate increase is sufficient to warrant the belief that continued co-operation will produce a demand for electric vehicles far beyond the capacity of the present manufacturing facilities, and justify the prophecy that "the time is not far distant when the general use of the electric vehicle may be expected to tax to the limit existing central station installations."

Electrics Used by Railroad Companies

The illustration below shows one of the many vehicles used by the Pennsylvania railroad in Philadelphia, this being utilized for the transfer of freight. It is a little known fact that many of the railroads possess electric trucks which are found very useful in their terminal stations for various purposes. The truck shown was made by the Commercial Motor Company in Philadelphia, and is of 5-ton capacity. In the illustration it is seen with a capacity load. This size and type of car has four-wheel drive, which gives greater traction in the poorly paved freight yards. This function, coupled with a short wheelbase, allows of moving in very short spaces and thus transporting freight with a minimum of motions and of time lost.

One of the Many Electric Vehicles Utilized by the Pennsylvania Railroad at Its Philadelphia Terminal and Elsewhere

This same railroad has a number of trunk and baggage trucks in service, some of which it bought and others which were constructed at the Altoona shops. These are of a much smaller size and the operator rides on a platform at the end, the control mechanism being such that it can be worked equally well from either end.

Latest Street Sweepers Electrically Driven

Germany has been for some time prominent in electrical matters, and the present wholesale adoption of municipal apparatus shows a continuation of this tendency in that most of the cars are battery-propelled. The latest street washers and sweepers bought for Berlin are of this type, the batteries being carried forward under a hood similar to a gasoline car, while the driver is placed above on top of the water tank. There is a motor on each wheel and the sweeper is driven from the rear.

Many Vans for French Mail Service

FOLLOWING a somewhat unfortunate experience with motors in the delivery of mail, the Paris postal authorities have shown their faith in this method of transporting the mail by purchasing 141 additional vehicles. These are divided into three groups according to capacity by weight and bulk. Formerly the work was done by contract with a small concern which operated few motors.

The former company operated the service in such a manner that it soon became bankrupt and it became necessary for the Postmaster General to step in and take over the fleet of cars left by the bankrupt contractor. This has been found exceedingly difficult and many times additional cars and taxicabs have had to be hired.

Recently a new and stronger company took over the work and added many cars. This concern, the Compagnie Generale des Automobiles Postales, has had extensive experience with a renting service in the city.

The postal work consists of the carrying of mails between the central offices and the various railway stations, and from the sub-offices to the central and vice versa. The area to be covered is comparatively small, Paris being artificially limited by the fortifications. The contract stipulates that the operating company shall have in constant service, or ready to be put into service at a moment's notice, a fleet of 141 vans; naturally the total must be greater to allow for those vehicles under repair—170 in all.

Three types of van have to be provided; 64 light vehicles carrying a load of 16 cwt. and having a capacity of 70 cubic feet; 61 vans carrying 24 cwt. with a body space of 105 cubic feet, and 16 vans designed for a load of 36 cwt. with a body space of 141 cubic feet. According to the estimates of the postal authorities the light and the medium classes will each have to cover a distance of 869,000 miles a year, while the total yearly mileage of the heavy vans will be 186,000 miles, making a total for the entire fleet of 1,924,000 miles. Estimating on 300 working days a year, this gives an average of, roughly, 45 miles a day for each van.

Payment is made to the contracting company on a mileage basis, the average of several routes being taken in order to determine the distance between any two points. The contract stipulates that all the journeys must be made at a minimum average speed of 250 meters a minute, which works out at 9.3 miles an hour.

The minimum speed indicated is a most important factor, for under the old contract such a high rate of travel was insisted on that utter recklessness had to be indulged in in order to make the journeys on time. Urged on by their employers and harrassed by fines, the postal-van drivers became the terror of Paris. Accidents were reported every day, but the police, acting on instructions from headquarters, refused to take any action; indeed they gave to the postal-van divers a range of liberty which would not have been tolerated elsewhere. Although the present average speed is satisfactory for long runs, it leaves very little margin for short journeys made in the busy hours of the day.

In order to carry out its services, the Automobile Postal Company placed orders with the Delahaye Company and the de Dion-Bouton Company. The de Dion concern has supplied all the heavy vans and some of the 24 cwt. type, while the others are from the Delahaye factory.

All the vans are fitted with solid rubber tires, most of them supplied by the Continental Company; some of the smaller Delahayes have the Ducasble patented cushion type in front, with solids in the rear. In these cases the ordinary springs are supplemented by auxiliary shock absorbers front and rear. The bodywork presents no unusual features, the vans having double doors at the rear and a single door in front, with a safety arrangement to prevent the rear doors being opened without the knowledge of the driver. A seat is provided by the side of the driver for the convenience of the postman generally accompanying the van. The drivers are appointed by and are under the control of the operating company, but supervision is exercised by the postal authorities; the men are supplied with uniforms by the postal department.

A Pair of the New Paris Postal Vans, Viewed from the Front and Giving an Idea of the Body Form Used

Cost of Operating Commercial Vehicles

What It Costs to Use a Motor Truck in a Number of Different Lines of Business Bringing Out the Splendid Economy Noted in Widely Varying Work and Under Decidedly Different Conditions

SOME good figures on the relative cost of motor trucks as compared with horses in general teaming and truck work are furnished by E. W. Oatley & Co., Springfield, Mass., which concern is operating four motor trucks and 46 horses in teaming work in Springfield and Western Massachusetts over a territory embracing Pittsfield, Hartford, Worcester and other cities, deliveries covering distances up to 75 miles. The teaming work of this company is extremely varied as it covers all fields of trucking and so it is almost impossible to get accurate comparative figures of horse and motor cost.

The motor equipment consists of three 3-ton Garford trucks and one 3.5-ton Alco. The trucks give best results in long-distance hauls. Trips of 25, 30 or 50 miles to the towns and cities surrounding Springfield are constantly made. Furniture loads have been taken even as far as Boston, a distance of 100 miles; Worcester, 55 miles, and Pittsfield, 56 miles, are cities to which many trips are made each year, and Hartford, Conn., 28 miles, as well as other cities a like distance from Springfield, must be figured on frequently as cities to or from which loads must be hauled.

In former days these long distance hauls were done by horses. Mr. Oatley shows concretely where he has gained by securing motor trucks for this work. To make the Hartford trip with horses took 2 days and left the animals in such condition that they must rest in the stables for another half day. This same team, if kept busy in Springfield, would earn $12.50 a day, or about $31.00 in the time that was spent in the Hartford trip. A truck makes this trip in 1 day and is ready for another trip like it in the morning. The charge for a load of furniture to Hartford is $30.

The men who traveled on the wagons to Hartford had to be provided with extra expenses for board and hotel rooms while out of town. These expenses the truck saves. A further test of one of the trucks in Mr. Oatley's service came one day when a load was carried to Warehouse Point, Conn., 14 miles, the return made to Springfield, and another load carried to Turner's Falls, through a few inches of snow, a distance of 40 miles, the return again made and a third load carried to Portland, Conn., 42 miles, and the truck brought back to Springfield, all in one day. With one truck 68 tons of iron water pipe was transferred a distance of a half mile from freight cars to an open lot in 1 day.

In comparing the costs which are given in tabulation herewith it is shown that a motor truck costs $11.96 a day as compared with $4.63 for a two-horse team. The figures as given for the animals were obtained by striking an average on the cost as shown by 50 horses with vehicles for the period given. The figures are made on a valuation of $1000 and the entire expense of the year is charged against 313 working days. The cost of shoeing the horses and repairing the wagons is kept very low by having a blacksmith who is paid wages by the company and is regularly employed in doing only its work.

The Oatley Company keeps separate accounts of the cost of maintaining and running the motor trucks and the cost of the horses and wagons used. An interesting comparison of the cost is thus made possible. The following figures are for the year between Feb. 1, 1911, and Feb. 1, 1912, and have been made out to show the daily cost of a 3-ton motor truck and a pair of horses with wagon truck. The figures as given for the commercial cars are not made out for simply one truck. They were obtained by striking an average from the showing made by three, two of which were Garfords and one an Alco.

Two of the Garford Trucks in the Service of the Oatley Transfer Company of Springfield, Mass.

Motor Driven Vehicles

Average Daily Cost of Operation of 3-Ton Truck.

Fixed charges, valuation, $3500.	
Interest	$0.70
Storage at $7.50 a month	.25
Insurance (fire and liability only)	.84
Amortization, 20 per cent	2.33
Variable charges on basis of 50 miles a day.	
Driver	3.00
Gasoline	1.63
Oil	.22
Tires	2.17
Repairs	.82
Total	$11.96

Daily Cost of Operation of Pair of Horses and Wagon Truck.

Feed	$1.02
Shoeing	.085
Wagon and harness repairs	.20
Veterinary	.015
Insurance	.075
Rent and barn expense	.525
Interest	.20
Loss and depreciation	.26
Driver's wages	2.25
Total	$4.63

Mr. Oatley is convinced that for the long haul work the motor truck is the only economical thing. In city work he is not so sure but what horses are cheaper. The cost of maintenance gives some idea of comparison, but as Mr. Oatley has found that one truck can sometimes do the work of five teams, and at other times the work of but three, according to the work in hand, there is scarcely a common ground for comparison.

Gasoline and oil for each truck for an average 6 months cost $21.44, while tires and repairs for the same period total $30.30. Wagon repairs for an average 6 months cost $541.25, and the shoeing of the horses $4.38. To feed, stable and care for three horses costs $690 for an average 6 months. Those who can find any arguments in these figures may do so, but Mr. Oatley states that he prefers to figure each city job as it comes up, noting whether or not money can be saved by using a motor truck instead of horses.

As a sample of one of these problems that worked out in favor of the automobile, Mr. Oatley tells of making five trips a day with a truck over 5 miles of very bad roads with 4500 pounds of cement on each load. He had tried horses on the same job and found that one team could make only three trips in 3 days, or a trip a day.

With the truck cost at $11.96 a day, or practically $12, while the two-horsed team amounts to but $4.63, it is apparent that the former must do more than 2.6 times as much work as the animals to make an equal profit, except in such cases as has been brought out above where stable charges for the animals and hotel expenses for the men must be added in case the horses are utilized. Otherwise, it would appear from the Oatley figures that in general teaming, motor vehicles must do about three times as much work as a two-horse team, or the equivalent of three of them, in order to show a greater profit and warrant the greater initial expenditure.

Four-Ton Truck Hauling Supplies

In hauling masons' supplies for general construction work, the Howards Company, New Haven, Conn., has during a few months' operation of a 4-ton Kissel truck secured figures on cost of operation which show that in a year the company can save $1,600 by the use of the truck as compared with the cost of three two-horse teams which formerly did the work the truck is now doing. The $1,600 which can be saved the first year is in addition to writing off the entire cost of the motor truck.

Cost of Operating Truck in General Teaming

Three Double Trucking Teams.

Cost of six horses at $300	$1,800.00
Cost of three wagons at $450	1,350.00
Cost of six harnesses at $35	210.00
Cost of keeping horses at $25 a month	1,800.00
Repairing harnesses, wagons, etc.	100.00
Interest on investment	336.00
Drivers' salaries $12 a week	1,872.00
Total, horses	$7,468.00

Kissel Kar 4-Ton Truck.

Cost of 4-ton truck	$3,800.00
Gasoline, 2400 gallons a year at 10 cents	240.00
Oil, 156 gallons a year at 23 cents	35.88
Driver's salary at $18 a week	936.00
Amortization, 10 per cent. on $3,800	380.00
Interest on investment	380.00
General overhaul, once a year	150.00
Total, truck	$5,921.88
Balance in favor of Commercial Vehicle	$1,546.12

The truck averaged 484 miles during the first few months; average gasoline consumption was 7.6 gallons a day and oil 2 quarts. On the basis of the former figure, 4.8 miles were obtained for each gallon of fuel. In the following table, compiled by the truck owners, it will be noted that 10 per cent. depreciation has been added, despite the fact that the entire first cost is figured in. This seems a rather peculiar method of figuring in that the owner when writing off during the very first year the entire truck cost and 10 per cent. more still had the truck left. The following are the yearly cost figures:

These figures demonstrate that a truck can displace eight to 10 horses and make an annual saving of approximately $2,000. If, as is customary, the truck owner had written off 20 per cent. for truck depreciation, figuring truck life at 5 years, exactly $3,000 would have been saved by the truck in the first year of use.

Police Patrol in the Northwest

Chief C. H. Troyer of the police department, Duluth, has kept the cost of operating a four-wheel-drive patrol wagon in that city during the past 2 years and figures are given herewith showing this cost of operation as compared with actual cost figures for similar horse service. The motor patrol has a four-cylinder motor 4.25 by 4.5 inches bore and stroke. The vehicle is a special design which drives by shaft to the front and rear tire axle. The front wheels only are used in steering.

In cost of operation the motor patrol showed a saving of $122.14 over the horse system in a 2-year period. This saving is relatively small but might be counted balanced by the facts that the patrol has saved the construction of substations and has prevented the loss of life and property by being on the spot in much less time. Owing to the fact that a motor patrol should last 10 to 12 years, care should be taken that it is possible to purchase repair parts for the vehicle during its life. In other words, guaranteed reliability by the firm that parts will be furnished during the life of the car.

Cost of Operation of Patrol for Two Years

Cost of Automobile.

Gasoline	$284.61
Oils and grease	71.17
Tire repairs	None
Tire depreciation	340.00
Driver	2,160.00
Helper	1,920.00
Amortization at 16 per cent.	896.40
Interest at 6 per cent.	324.00
Total	$5,996.18

Cost of Horses.

Board, a day $0.383 each	$1,118.75
Shoeing	208.80
Veterinary	35.25
Driver	1,920.00
Helper	1,920.00
Depreciation, horses at 20 per cent	440.00
Depreciation, wagon at 16.6 per cent	232.40
Depreciation, harness at 16.6 per cent	19.92
Interest at six per cent	223.20
Total	$6,118.32
Money saving by motor car	$122.14
Miles traveled by horses	6,553
Miles traveled by automobile	5,611
Cost a mile by horse	$0.934
Cost a mile by motor	$1.068
Calls made by horses	5,782
Calls made by motor wagon	5,032
Cost a call by horse	$1.060
Cost a call by motor	$1.191

Heavy Trucks in Brewery Work

The Knox company delivered some motor trucks to brewers in 1901 and 1902 and one of these concerns has furnished figures showing the cost of operation of these vehicles. The performance of a 16-horsepower truck for a period of 11.5 months was as follows; these figures being taken from the second year's work of the truck in order to get a more accurate gauge on tire repairs and general repairs:

Cost of repairs, tires and insurance	$224.50
Driver's wages	885.00
Gasoline	204.30
Oil (for 4 months only, previously included in gasoline)	9.80
Cash (supper and overtime money for driver)	58.00
Total	$1,381.60
Average cost per month	$115.33

Performance.

Total mileage	8,000
Running days	264
Idle days (holidays, driver sick, and repair time)	31
Gasoline in gallons coosumed	1,190
Average daily mileage of truck	30.3
Average miles a gallon	6.72

Compared with these figures on cost of motor truck maintenance and performance are figures furnished by the Springfield Breweries Company, Springfield, Mass., with a 3-ton truck of 40-horsepower. This truck works over a route with several long steep hills and also many rough sections of roads and since its installation has done the work of two wagons and five horses.

In making a comparison of the saving effected on the former horse outfit it is interesting to cite a definite case of delivery between two points situated about 9 miles apart. When the horse teams were used it was found impractical to make the complete trip over the road, so the two teams delivered the barrels of beer at the railroad freight house, a distance of about 2 miles from the brewery, and the remainder of the distance was made by rail. In the figures no account is made of the charge for hauling to the saloons at the other end, as properly should be done inasmuch as the motor truck of course took care of this part as well and made a delivery actually at the saloons which were to receive the consignment, carrying the shipment right through to its destination without rehandling.

The following are the tabulated results secured from each method:

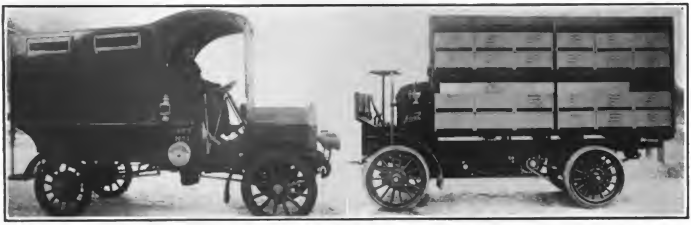
Saving Shown in Brewery Trade

With Horses.

Depreciation, interest and insurance	$2.36
Labor	2.77
Freight (loaded)	10.94
Freight (empty: returning barrels)	9.73
Total	$25.80
Total number of half barrels moved in one day, 128.	
Cost a half barrel	20 cents

With Knox Truck.

Amortization, interest, insurance and garage	$3.76
Tires	1.66
Labor	3.41
Gasoline	1.98
Oil	.20
Total	$11.01
Total number of half barrels moved in one day, 128.	
Cost a half barrel	8.5 cents



Vehicles Utilized in Service Described Herewith. At Left, Duluth Four-Wheel Drive Patrol; at Right, Knox Brewery of 16 Horsepower, Showing Load of Bottled Goods

This truck makes on an average 75 miles a day, loaded most of the time, as it carries loaded or empty beer barrels both ways, and for 5 months its total cost for repairs did not exceed $50.00.

Besides this actual saving of 11.5 cents a barrel on cost of delivering, the empty barrels were returned to the brewery more promptly and in better condition.

In Coal Hauling for Retail Delivery

A side light on the cost of motor truck operation for coal with a modern unloading body is given in figures furnished by Olin J. Stephens, Inc., New York City, in the operation of a 4.5-ton Saurer fitted with a Wright elevating body. The truck handles a 5-ton load, and averages 30 to 50 miles a day. Time in operation is saved by the elevating body which unloads through a side chute and can deliver coal a distance of 40 feet. Seven minutes are required in unloading. The average day's work of 10 loads amounts to 50 tons. The truck averages 9 to 10 miles an hour on a fuel consumption of 4.5 to 5 miles a gallon.

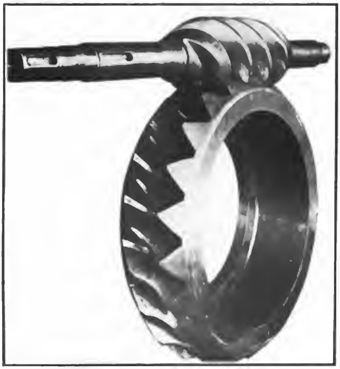
Compared with former horse equipment this shows much economy because with a two-horse truck handling 3-ton loads 25 to 30 minutes would be required to unload the coal, providing a dump body were not utilized.

Among the New Commercial Vehicles

Complete Details of the New A. O. Smith 3-Ton Truck, Which Has Many Decidedly Different Features, and One of the New G M C Electric Trucks, Which Are of a Distinct Type

FAIRLY bristling with new features describes the truck of 3-ton rating which has been produced recently by the A. O. Smith Company. This concern is well and favorably known as the largest producer in the country of pressed steel, hence it is not surprising to note a number of new ideas along those lines incorporated in the new commercial vehicle.

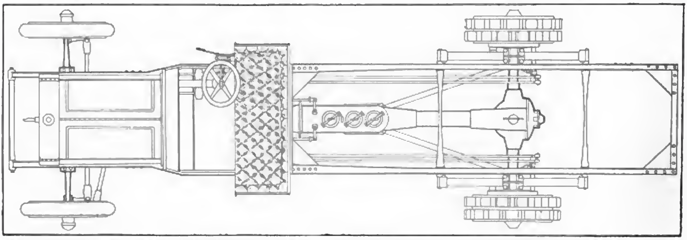
The vehicle is described as having the motor in front under a hood with the driver behind it, what has been termed the European location. It has shaft drive using a worm for the final reduction. It is said the initial design was tested out on the roads in regular daily service for 11 months, after which a few changes were made and the vehicle subjected to some 4 or 5 months' additional testing.



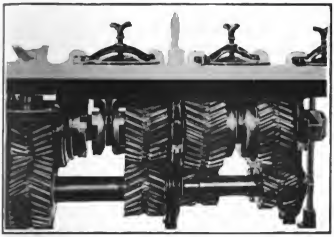
Driving Worm and Gear, a Smith Truck Feature

The chassis was designed with the idea in view of removing each major portion of the mechanism as a unit and without disturbing other parts. This makes it possible for the business house to remove a unit which is giving trouble and substitute another, delaying the vehicle for a minimum space of time.

Thus the power unit or engine may be removed by taking off four bolts, this with the radiator being mounted on a subframe. The radiator alone may be taken out independently without touching the motor. The clutch can be taken off without disturbing the pedal shafts or transmission. The gearset mechanism can be removed without disassembling or touching other units or the transmission case. The worm and gear with all bearings are removable from the rear of the axle housing. The steering gear can be taken out by loosening three bolts, while the screw can be taken out of the gear by taking off a nut at the bottom and sliding it out. To bring about these results has necessitated many novel departures, as, for instance, the housing for the transmission, driving shaft, worm and gear and rear axle is made as a unit, although composed of several different pieces. This cast steel member is not supposed to be disturbed on the chassis at any time. The transmission is taken out by loosening the bolts which hold it in place, when an overhead crane is brought into play and the upper part or cover with the gears and bearings is lifted out vertically. Similarly with the worm and gear; to take these out a crane is employed, loosening the bolts and removing the live axle shaft permitting the removing of this with its



Plan View of the Smith Chassis, Showing Distribution of the Units, and in Particular, the Transmission, Worm and Shaft Housing



Gears, Cover and Bearings of the Smith Transmission

earings and the rear cover. For this purpose both units have a large hook incorporated.

The transmission is of particular interest. This is of the selective individual clutch type with gears constantly in mesh, giving three speeds forward and one reverse. The gears are of the herringbone type cut by a patent process from a single blank of specially heat-treated steel. The gears have a 3-inch face and their shafts are mounted on annular ball bearings. The gear ratios afforded by the transmission are as follows, the motor being limited by a sealed governor to 1000 rpm:

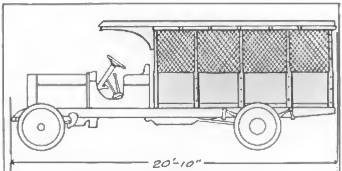
Gear Ratios and Speeds, Smith Truck

Speed	Reduction	Vehicle Speed Mph at 1000 Rpm
Low	32	3.38
Second	16	6.75
High	9	12.00
Reverse	35	3.08

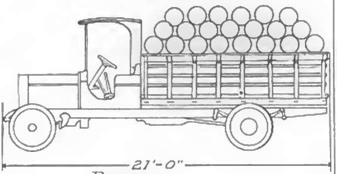
Specifications of the 3-Ton Smith Truck

Wheelbase	168 in.	Stroke	5 5 in.
Tread, front	68 in.	Tires, front	36 by 5 single
Tread, rear	68 in.	Tires, rear	36 by 5 dual
Overall length, chassis	250 in.	Tire mileage, guaranteed	10,000 miles
Length platform space	144 in.	Platform height, unloaded	45 in.
Height, driver's seat	53 in.	Platform height, loaded	43 in.
Clearance, front axle	12 in.	Minimum platform height to clear wheels	42 in.
Clearance, rear axle	10 in.	Final drive	Shaft
Turning radius	25 ft.	Weight of chassis, without body	6,200 lbs.
Width of frame: in front	36 in.	Weight of chassis and body, approx.	7,000 lbs.
in rear	42 in.		
Horsepower	36		
Bore	4.5 in.		

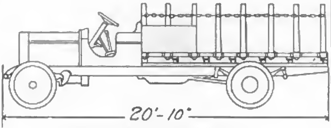
Special Features: Worm drive, herringbone transmission, vertical copper tube radiator without fins, driver behind motor, steel wheels, extensive use of pressed steel and removable units.



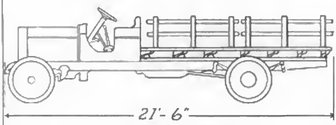
Screen Side Dry Goods



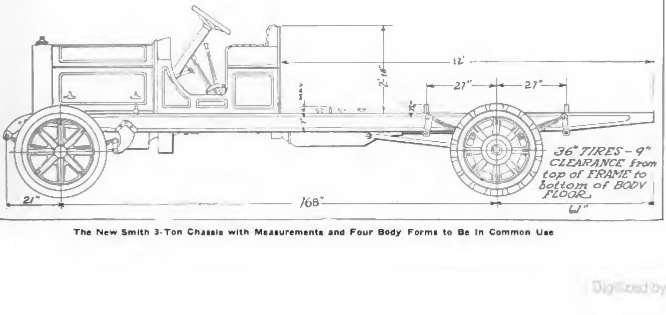
Brewery



High Stake Platform



Low Stake Platform



36" TIRES - 9" CLEARANCE from top of FRAME to bottom of BODY FLOOR

The New Smith 3-Ton Chassis with Measurements and Four Body Forms to Be In Common Use

The final worm is made of alloy steel and the gear of phosphor bronze. It is of the straight type with three threads, while the gear has 27 teeth. This member, made in England, has a 30-degree pressure angle, a 30-degree lead angle and 1.5-inch linear pitch.

Steel wheels are used. As compared with wood, the weight of the front member with tires is given at 310, in wood 330 pounds. The rear include dual tires, hubs, bearings, brake drum and hub caps; that is, it is complete. In this shape wood weighs 680, steel, 650 pounds. Here is a direct saving of 20 pounds in each front wheel and 30 in each rear, or 100 pounds total with greater strength and superior life besides. Without a doubt this has a bearing upon the total weight, given by the maker at 6200 pounds for the chassis only.

Many of the operating rods are of pressed steel, of an inverted U section, while the frame has an indented center portion which is said to make it the equal in strength of a section several inches higher and with a further saving in weight. The specifications and body sketches herewith present additional figures and facts of interest.

Features of G M C Electric Trucks

THE General Motors Company has recently produced under the supervision of John M. Lansden, formerly head of the concern bearing his name, a complete line of electric trucks which possess many novel features. These have the general appearance of a gasoline vehicle due to the unusual placing of the battery box, while the same idea is carried forward in the use of a short high bonnet in front of the dashboard and of a control group which parallels the other very closely.

This is produced in eight carrying capacities, each in three frame lengths, so that the total list really comprises 24 different vehicles. For any of these the batteries may be as desired. The weight range is from less than 1000 up to 12,000 pounds.

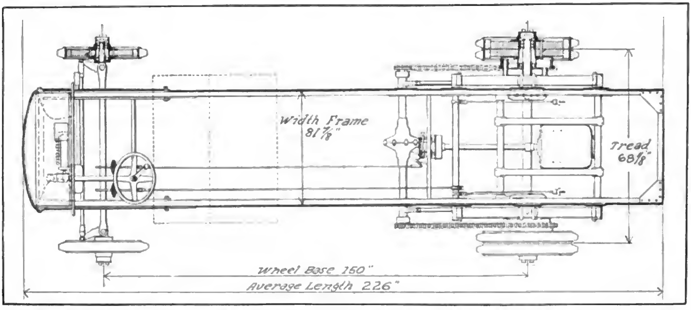
In this design the batteries have been moved from the usual amidships location, slung beneath the chassis frame to a position near the front end and above the frame. There they are said by the makers to be out of the way of dust, dirt, water and are less liable to troubles and derangements; the ground clearance is increased greatly; the weight distribution is improved and there are other advantages. Of very pointed usefulness, it allows of a much shorter wheelbase for special cases than would be possible otherwise. For some dump bodies this is extremely desirable.

Accessibility is made a prominent feature, both of batteries and of controller as well as the other units. The motor is slung above the rear axle from the frame, in which position it drives the countershaft by means of a flexible flat steel spring shaft. From the countershaft the rear wheels are driven by the usual side chains.

Load distribution is 25 to 40 per cent. to the front axle and 60 to 75 on the rear. The former is made up of the body, battery and chassis weight and a very small part of the load, while the latter consists of the rear construction, motor and live load. This results in an equality of tire wear which is most desirable. The G M C batteries used have a KWH capacity of 21.5, which will give 30 miles of full load running on a charge or about 40 miles on half a load. The alternate Standard battery has a KWH capacity of 24 and gives 35 and 45 miles, respectively. These weigh 2260 and 2490 pounds, respectively.

All three chassis lengths in the 3-ton size which has been chosen for illustration have the same rated speed, 8 miles an hour. With an overall length of 226 inches and a wheelbase of 150 inches, the middle length will turn in a 65-foot circle or a 32.5-foot radius. For the short chassis the figures are 202 inches, 138 inches, 59 feet and 29.5 feet. On the long frame they are 250, 168, 72 and 36.

Any body form may be had, the shop facilities being such that any ordinary type can be produced with little delay. These are listed as regular: Bent panel, vestibuled form, vans, sightseeing, plain panel, rack, cage,



Plan of the 3-Ton G M C Electric Chassis, Showing How the Units Are Disposed. The Battery Box Is Shown Dotted at the Front

Accessibility of Batteries on G M C Electrics

express, brewery, rack, box, stake, platform and others.

In the accompanying illustrations the accessibility of the various units is brought out. For instance, with the new position of the battery box, it is important to know that the batteries can be reached readily. As the illustration shows, this may be done by raising the cover which carries with it the driver's seat and is hinged at the back, when the cells are both visible and accessible. By lifting the hood, the controller, most of the wiring and other parts are reached. This is hinged at the dash and lifts just like the hood of any gasoline car. In the accompanying panel of body forms, the idea was to show the general appearance and size overall of the 3-ton chassis as it would be in the service of different merchants. For this purpose the combination panel and stake as used by piano and department stores, the closed panel, the removable side gate stake as utilized by wholesale grocers and the low side platform with removable sideboard were chosen. Below the chassis proportions are given, which the table supplements.

Specifications of G M C 3-Ton Electric Truck

*Wheelbase	150 in.
Tread, front	64 in.
Tread, rear	68⅛ in.
Overall length, chassis	226 in.
Length, platform space	160 in.
Turning radius	32.5 ft.
Width of frame	40 in.
Width overall, without body	81⅞ in.
Horsepower	
Number of motors	One
Tires, front	32 by 3½ single
Tires, rear	36 by 3½ dual
Tire mileage, guaranteed	
Wheel diameter, actual	
Platform height, unloaded	38¾ in.
Platform height, loaded	36¼ in.
Min. height to clear wheels	36¼ in.
Final drive	side chains
Weight of chassis without body	
Weight of chassis and body.	

Special Features: Battery position above frame, flat steel spring drive from motor to countershaft, accessibility of all parts and division into units each light enough for one man to handle.

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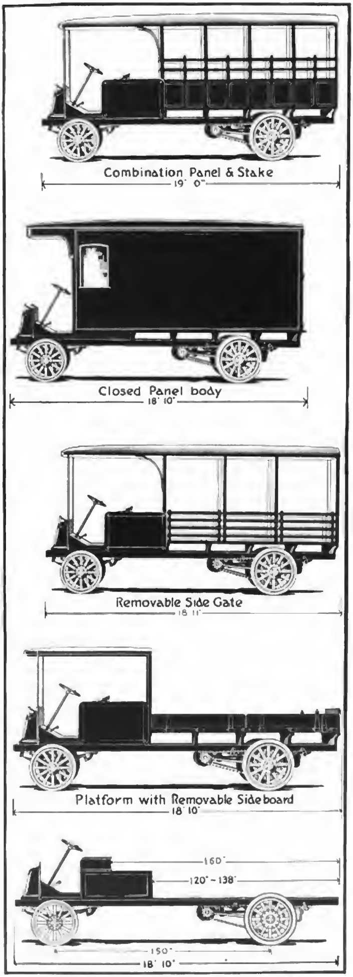
*Short chassis, 138 in.; long, 168 in.



G M C Electric Chassis Outline and Four Usual Bodies

Mechanical Notes for Truck Drivers

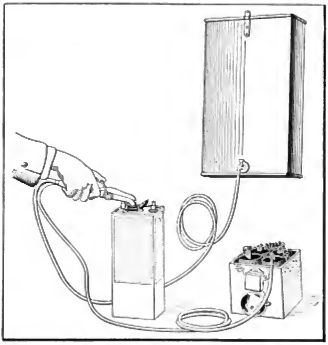
Care of Storage Batteries

MANY mechanics have fear of anything electrical, but this is not well founded and by using a few simple rules can be overcome readily. When considering the use of storage batteries in a truck, the driver and shop man have little to do other than to keep them well filled with electrolyte, operate within the battery's capacity and charge as frequently as is necessary.

Considering the usual or lead cell, the following advice is given by a prominent maker of electric commercial vehicles and applies to the handling of them in regular service:

1. Keep the electrolyte at the proper height above the top of the plates.
2. A battery should not be charged excessively.
3. A battery should be given plenty of ventilation while charging.
4. The battery temperature should never exceed 105 degrees Fahr.
5. All battery connections should be kept clean and bright.
6. Any low cells must be located and repaired at once.
7. Battery compartments must be kept dry.

In the lead cell, the electrolyte is a solution of distilled water and sulphuric acid. In making this from pure acid, the water should never be added to the acid but the latter poured very slowly and carefully in extremely small amounts into a quantity of the former. When the liquid within the battery gets low, the deficiency may be made up by pouring distilled water into it. The liquid should stand approximately one-half an inch above the plates. Once a month, when the battery is fully charged, the specific gravity of the cells should be tested with an hydrometer and compared with a standard table issued by all battery firms for this purpose. If the gravity be too low, more acid must be added to bring it up.



Method of and Apparatus Used in Refilling Edison Batteries

Charging is not complicated, although the batteries may be ruined in several ways. If the charging be done too frequently, harm will result, and similarly with charging too long at a high rate. A battery should not be charged until it has run more than 50 per cent. of its capacity, unless so doing would necessitate leaving it partly discharged for several days. By this is meant, if the battery will run the vehicle 60 miles on a charge, it should not be recharged until more than 30 miles have been done, with the exception noted above. Excessive overcharging results in deterioration of the valuable plates, but a little at slow charging rates is advisable about once every three weeks.

No battery should be discharged below 1.70 volts a cell. When a voltmeter reading shows close to this, charging is necessary. This means that a 32-cell battery must be charged when the decreasing voltage passes 55. No battery should be allowed to stand discharged as the plates will then be sulphated and their usefulness destroyed. If this condition be not too bad, a long charge may restore it to good condition. In this operation, the voltage is liable to run up very high at first, but so soon as the sulphate breaks down, normal readings will result.

It is a good rule never to let the battery feel very warm to the hand. If the temperature runs up rather quickly, stop charging for a while. On the other hand, if it warm up quickly but the voltage drops quickly when running, look for short circuits. It is a good plan to discharge the battery down to 1.70 volts about once a month and then build up with an entirely new charge. When the cells are discharged is a good time to go over them with a low reading voltmeter, as in this way the low ones may be discovered and removed.

Clean and bright terminals give a good flow of current, while dirt and grease provide resistance which must be overcome, with a consequent loss. Any cell bottom board should have a good drainage, as the trays standing in acid which has spilled over will soon rot away. Similarly water reduces their strength and effectiveness.

In the new Edison nickel-iron batteries, the rules are considerably different owing to the differently constituted units and the distinct materials used. Not so much care need be used with this type as it has been designed and constructed so as to be nearly foolproof, but it is well to observe a few simple rules. To give a set of rules like those previously given for lead, the Edison battery should be handled as follows:

1. The supply of electrolyte should be maintained at a reasonable height.
2. The battery is improved by overcharging occasionally, and the makers advise this when it is new.

3. Ventilation is unnecessary as no acid fumes are present.

4. The temperature is immaterial.

5. Battery connections should be clean and bright.

6. Low cells will be built up by the adjoining ones with little diminution of the total output. Nevertheless it is well to look for and avoid very low units.

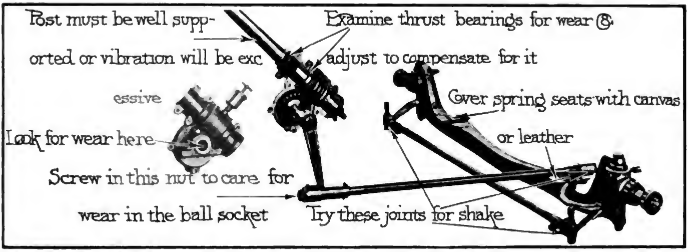
7. It is well to keep the battery compartment dry but the cells being waterproof, water or dampness can do no actual harm.

The electrolyte is an alkali solution which is not so corrosive as acid. It is a 20 per cent. solution of potash and is supplied preferably through a filler supplied by the company, although this is not necessary. This is shown herewith in Fig. 1 and consists of a small metal tank to be filled with the liquid, a connecting rubber hose, a special funnel and an indicating device with dry batteries and a bell to show when sufficient electrolyte has been added.

The tops of the metal cans in which the active materials are placed are electrically welded and there are but four openings in them. Of these, two are for the binding posts and have stuffing boxes through which the former protrude. The others are the separator and the filler. The former is used to separate the spray from the gases when the battery is charged, thus preventing loss of potash and lack of odor. In this way, the gas is allowed to escape but none of the potash from which the electrolyte is formed. It is for this reason that ordinarily, only distilled water need be added to weaken the solution down to the usual strength.

The filler has a water-tight cover held by a spring. It is for the purpose of allowing suitable filling and the lower portion of the funnel fits into it.

It may be said then that filling the nickel-iron type of battery consists of springing the cover of a unit, inserting the funnel, pressing the lever so as to allow the liquid to flow, and continuing to press it until the bell rings. It is then released, the flow stops, the lever is removed, the spring cover snapped back in place, and another cell attended to. This battery has been designed primarily for the unskilled battery man or mechanic and the pains taken to make filling simple and charging or discharging damage a minimum, if not non-existent, have been outlined briefly to emphasize this point.


Post must be well supp-
orted or vibration will be exc
essive
Examine thrust bearings for wear &
adjust to compensate for it
Cover spring seats with canvas
or leather
Look for wear here
Screw in this nut to care for
wear in the ball socket
Try these joints for shake

Steering Gear and Axle Parts Pointing Out the Possible Sources of Trouble and Suggesting Remedies for the More Important Ones

Renewing Axle and Steering Parts

In the spring of the year, whether the truck has been used during the winter or not, the steering mechanism and front axle should be examined with great care as the safety of vehicle, driver and load depend upon these parts. In the accompanying illustration, Fig. 2, attention is called to a number of these points on an actual steering gear and axle group.

First the steering post should be fixed firmly in position, either on the frame or dash, or both; if not vibration will result which will tire the driver's arms very quickly. Next the fixing of the gear on the frame is important, as unless this be firm a turn of the wheel will not result in an equivalent movement of the front wheels. The lubricant in the case should be cleaned out and replaced with fresh, and all grease cups examined and refilled.

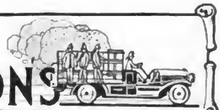
The steering rod, which connects the lever on the steering gear with that on the steering knuckle, should be tight at both ends, as far as shake or the presence of wear is concerned, but should not bind in any position. If the ends are fitted with springs to take up shocks, it is possible these will stand a little adjustment.

On the axle itself, the bearings are most important and should be inspected with care and precision. They should be cleaned thoroughly and looked over for wear or defects, while the hubs should be cleaned out and filled with new lubricant. If the axle be taken off of the car so as to detach it from the springs, it is a good idea in replacing it to cover the spring seats with canvas or leather well soaked, the former in white lead, the latter in oil. This cushions the springs better.

Renewing Old or Weak Dry Cells

When the dry cells give out unexpectedly and no new ones can be obtained readily the following method for renewing them may be of use: Bore holes in the tops of the cells and moisten their interiors with a solution of sal ammoniac, salt water or vinegar. Another method for renewing dry batteries consists in making a solution of calcium chloride, crystallized, 30 parts; calcium chloride, granulated, 30 parts; ammonia sulphate, 15 parts; zinc sulphate, 25 parts. Apply this solution in the manner already described. The latter method should be used only in an emergency.

MUNICIPAL SERVICE EXTENSIONS



Milwaukee Fire Underwriters' Patrol

IN the illustration below is shown the latest addition to the municipal vehicles owned and operated by the city of Milwaukee. This is a Stegeman car built on a truck chassis for the Board of Fire Underwriters of the city. The heavier construction was selected in order to produce a rugged vehicle which would withstand the severe service of negotiating hills at speed.

This differs from standard Stegeman construction in that underslung springs are used to lower the center of gravity and make the car more safe, and in the distribution of weight to give a very large percentage over the rear wheels. The latter brings about easy steering and good traction at all times. This is the second piece of motor-driven fire apparatus in the city.

Cost of Operating Fire Apparatus

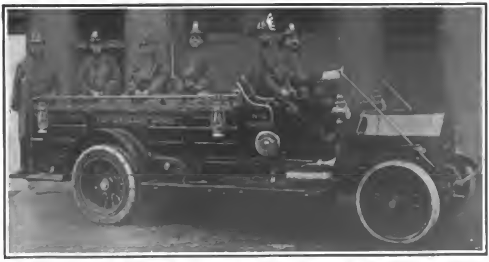
Chief James McFall, of the Roanoke, Va., fire department, who is also secretary of the International Association of Fire Engineers, furnishes the following figures on the cost of operation of motor-driven apparatus in his city for the 5 months ending March 1:

Company.	Mileage.	Gasoline Gals.	Lub. Oil Qts.	Miles a Gal.—Gas.	Miles a Gal.—Oil.
No. 4	197.3	167.0	30	1.18	6.57
No. 5	147.8	130.5	20	1.13	7.39
No. 6	87.0	77.5	13	1.12	6.70
Totals	432.1	375.0	63		
Averages	144.02	125.0	21	1.142	6.887

The cost of these items was:

Company	Gasoline.	Oil.	Total
No. 4	$20.04	$3.30	$23.34
No. 5	15.66	2.20	17.86
No. 6	9.30	1.43	10.73
Totals	$45.00	$6.93	$51.93
Additional minor repairs			$34.40
5 months dept. cost—less salaries and overhead			$86.33
Average dept. cost, 1 month			17.266

It is figured that six horses have been replaced by these three pieces, and that the former would have cost at current rates $15 each a month, hence the total cost would have been $450, thus showing a saving of $363.67. On this basis, the full year will show a saving of $900.



Stegeman Fire Underwriters' Patrol Recently Installed at Milwaukee

Slower Municipal Cars In Wilmington

On account of the numerous complaints against the speed of the many municipal cars owned in Wilmington, including patrols, ambulances and fire apparatus, the City Council has taken up the subject and after an informal discussion it was decided to advise all concerned that unless the speeding ceases legislation reducing the maximum speed to 20 miles an hour will be enacted. No further action than this was taken.

Many Police Patrols In Use

In Birmingham, Ala., the police department is rejoicing over its new patrol recently put into service. This is called a local product, but consists of a Cadillac chassis upon which a locally-made body has been placed. This is said to be the first motor-driven patrol in the South, but at the same time Little Rock, Ark., reports the receipt and initiation of its patrol.

The latter is a 40-horsepower Moon with a body capacity for 10 persons. It is said to be able to make 50 miles an hour. New Orleans has received its combination fire patrol, which is built on a 40-horsepower Knox chassis. The body, which was built locally, holds 11 men comfortably. This will be utilized for fire fighting, insurance work, and at times as a patrol wagon.

Cheyenne, Wyo., has received and put into active use its 30-horsepower E M F patrol. Hamilton, Ont., is also in receipt of a machine, but as this was shipped from the United States in parts and will be assembled by the mechanics in the department, it has not yet been put into use. Binghamton, N. Y., has let the contract for a patrol of the motor-driven form and is waiting for delivery of the same.

Army of California Proves Truck Utility

In a recent series of maneuvers near Los Angeles, recently, a couple of motor trucks, using distillate as a fuel, made such an excellent record and performed the necessary work so well that the army men were a unit in declaring the days of the army mule numbered. The actions lasted but 3 days, but during that time, mountains were climbed and descended, streams forded, long arduous trips made up steep canyons practically without roads, and in additional ways the cars showed their mettle. The loads carried consisted of 93 officers and enlisted men of the Seventh Regiment, their field equipment including kitchen, 300 feet of lumber for disappearing targets and full rations for the 3 days. The vehicles are called Moreland,

Commercial Motor Vehicle Patents

BODY forms and tires still retain the attention of commercial vehicle inventors, these forming the major part of the month's patents. The two bodies chosen for illustration are both of the dumping form but of different types, while of the two tires, one is a substitute for rubber in the form of springs, while the other is a specially formed rubber and air combination.

Gregg Resilient Wheel

1,020,977, Vehicle Wheel, issued March 26 to Luther L. Gregg, Jr., Lonejack, Mo. This patent covers the combination of an inner and outer felloe, between which are coil springs. The inner ends of these rest upon a false inner felloe which is free to revolve and which carries a rack. With this a gear meshes, the purpose of this being to move the rack and limit tire movement.

Sherman & Getz Dump Body

1,020,665, Autovehicle Dump Body, issued March 19 to Fred T. Sherman and Herman Getz, Seattle. This is a combination patent on an automatic dumping body with a number of compartments, each of which dumps as the body is forced backward on an inclined track and closes when it is drawn forward again. For the latter purpose, there is a reel with cable or chain attachment to the movable body part, while the inclination of the runway makes the backward movement easy.

Galvin Combination Tire

1,021,515, Resilient Wheel, issued March 26 to Carroll D. Galvin, Merchantville, N. J. This has two felloes, the inner carrying the point of a heart-shaped hollow cushion tire. The outer part of this carries the second felloe with the usual demountable solid tire.

Holt Tractor Frame

1,020,283, Autotractor "A" Frame, issued March 12 to Pliny E. Holt, Stockton, Cal. This covers the use of a triangular framework for tractors, the single point being at the front, while the two points carry the driving mechanism.

Oliver Unit Power Plant

1,020,518, Motor-Vehicle, issued March 12 to Eric S. Sandgren and Charles F. Case, Detroit, assignors to the Oliver Motor Car Company, Detroit. This is the unit power plant of the Oliver cars and consists of a combination of frame and cross members, to the forward one of which the base of the engine is supported, while the second one carries the rear end of the transmission. The chain indicates the method of removal from above.

Wright Dumping Body

1,019,875, Side-Delivery Body, issued March 12 to Thomas Wright, Jersey City. This covers the combination of a base opening with a pair of inclined face doors, one on either side, to open communication on the respective sides, as desired. These doors are operated by means of a lever and cable or rod attachment. The framework includes additional chutes for guiding the discharge.

Additional Patents Issued

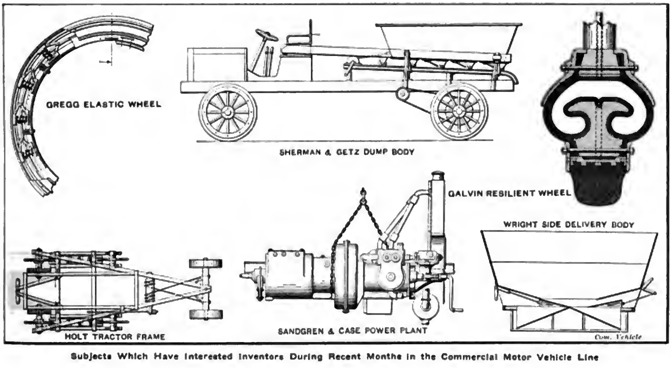
1,021,039. Carburetor for Internal-Combustion Engines; issued March 26, to Gogu Constantinescu, Bloomsbury, London, Eng.

1,021,197. Vehicle Driving and Braking Means; issued March 26, to Alvaro S. Krotz, Chicago, assignor to Sears, Roebuck & Co., Chicago.

1,021,240. Pneumatic Hub for Vehicle Wheels; issued March 26, to Tossanus Duysens, Maastricht, Netherlands.

1,021,251. Spring Suspension for Road Vehicles; issued March 26, to Leonard Harris, London, Eng.

1,021,355. Spring Wheel; issued March 26, to John C. Deckard and Isaac L. Deckard, Vincennes, Ind.



Subjects Which Have Interested Inventors During Recent Months in the Commercial Motor Vehicle Line

TRADE *and* PERSONAL ITEMS

THE Continental Motor Mfg. Co.'s new Detroit plant is shown in its present condition in an accompanying illustration, this presenting a full front view at one of the corners and giving an excellent idea of the enormous size of the buildings. The machine shop, testing house, heat treating plant and power plant being enclosed in the corner formed are not visible. These buildings will add 240,000 square feet of floor space to the present Muskegon plant's 110,000. The latter has an output of from 18,000 to 20,000 motors a year, which will be doubled by the new Detroit factory.

The Chase Motor Truck Company, Syracuse, will put on a large addition to their present factory this Spring.

The Chase Truck Company recently held a meeting at which it was voted to double the capital stock, making the capitalization $300,000 instead of $150,000.

F. P. Miles, president of the Miles Motor Tire Spring Company of Wilkinsburg, Pa., assisted by R. H. Black, C. C. Pence and I. W. Donaghey, is forming a company to manufacture a tire which it is expected will do much to relieve the troubles of motor truck people.

The Pittsfield Spark Coil Company, Dalton, Mass., recently held a meeting at which it was voted to increase the capital stock from $100,000 to $250,000. The following officers were elected: William O. Wood, president; Louis B. Hopkins, treasurer; these with Zenas Crane and Michael Casey constituting the board.

Factory Enlargements

The Julian Motor Company, Syracuse, N. Y., has just been formed to manufacture the Julian gasoline motor which Julian S. Brown, president and designer of the new company, has been perfecting for several years. He is a son of the well-known Syracuse manufacturer, Alexander T. Brown. It is expected a new plant will be built.

Latest Literature

The Mora Power Wagon Company has issued a catalogue describing its light delivery wagon.

Chas. E. Miller, New York City, has issued his annual catalogue of motor car parts and accessories.

The Stark Rolling Mill Company, Canton, O., has issued a booklet on alumaloyd for commercial car bodies.

Jarvis-Huntington Automobile Company, Huntington, W. Va., has issued a catalogue showing its line of trucks.

Albany Lubricating Company has issued a catalogue entitled Economic Lubrication, describing Albany Grease.

The Continental Motor Manufacturing Company has issued a folder entitled the Dividing Line, describing its commercial vehicle motors.

The Diagonal Block Tire Company, Urbana, Ohio, is issuing a catalogue entitled the Diagonal Way, which describes the new product, a diagonal block tire.

The National Lock Washer Company is issuing a pamphlet of lock washers, which consists of a reprint from one of the technical journals of the S. A. E. standardization work in this line.

The Republic Rubber Company, Youngstown, Ohio, is issuing another attractive booklet entitled "Two-in-One" and covers briefly the Staggard Tread tire and the Black-Line red inner tube.

The Hyatt Roller Bearing Company, Detroit, has produced one of the finest catalogs seen for some time in its Plant Book. This is intended to give users and prospective users of this firm's bearings an idea of the factory and processes employed, which it does by means of large and unusually clear half tones.

The Waverley Company has gotten out a neat little instruction book for the use of commercial vehicle chauffeurs. This deals primarily with the operation of Waverley electrics, but there is some excellent advisory matter included on unloading, lubrication, the use of brakes, care and repair of batteries and other subjects.

Personal Brevities

J. C. Weston has assumed charge of the Central District of the U. S. Tire Co.

T. J. Toner has been made manager of the Pacific Coast sales of the Studebaker Corporation.

Clarence M. Rodgers was recently appointed sales manager of the Bowling Green company.

Group of Packard Trucks Ready for Shipment, Representing One Day's Output from the Huge Detroit Factory

Scene on One of the New York Piers, Showing One-Third of a Recent Shipment of Saurer Trucks to Porto Rico

R. S. Bryant of the Standard Welding Company, Cleveland, has recently been appointed consulting engineer of that company.

Arthur J. Slade has removed his office to 1600 Broadway, New York City, where he will continue his consulting engineering work.

C. M. McCrerry has been appointed manager of the Boston branch of the Goodyear Tire & Rubber Co., succeeding W. T. Teagan.

G. M. Martin, formerly manager of the St. Louis branch of the Firestone Tire & Rubber Co., has been transferred to the Minneapolis office.

Charles Malley has taken charge of the New England territory for the Universal Motor Truck Co. and will open a branch for this company in Boston.

A. J. Rogers of the Remy company has been transferred to the San Francisco branch as manager. He will take charge of the entire Pacific Coast territory.

C. C. Hinckley has been appointed sales manager of the Covert Motor Vehicle Company of Lockport, N. Y. He was formerly with the Owen Motor Car Company of Detroit.

R. A. Weinhardt has severed his connection with the Henry Motor Car Company, Muskegon, as mechanical engineer, and is now connected with the Continental Motor Mfg. Co.

Frank D. Dorman has accepted the presidency of the newly organized Steinbock Engineering Company, Peekskill, N. Y. He was formerly secretary of the United States Motor Company.

E. F. Howell has been appointed district manager for the Chase Truck company. He will have headquarters at Philadelphia and his territory will include portions of Maryland, Pennsylvania, New Jersey and the entire State of Delaware.

A. D. Frost has been appointed manager of the New York branch of the Alco company. This office has just been es-

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Recent Incorporations in the Commercial Vehicle Field

Market & Harlem Auto Trucking Co., New York City. Capital $10,000. Incorporators: Burgess Osterhout, James L. Robinson and William Eastman.

Market Auto Garage Company, New York City. Capital $1,000. Incorporators: Patrizio Garofalo, John Sivigila and James M. Vincent.

Mitchell-Edmonston Garage Inc., New York City. Capital $10,000. Incorporators: Leland A. Mitchell, Geo. W. Edmonston and Jos. P. Bickerson, Jr.

Eureka Non-Skid Mfg. Co., Brooklyn, N. Y. To manufacture auto accessories, etc. Capital $2,500. Incorporators: Henry E. Bradford, James Colhourne and Brown Rolston.

Auto Transportation & Sales Co., New York City. Capital $1,000. Incorporators: Edward E. Manning, William Landseadel and J. Martin Berk.

Long Island Auto Truck Company, New York City. Capital $3,000. Incorporators: William L. Woodill, Peter J. Fisher and Wilson J. Backman.

Buick Sales Company, Utica, N. Y. To do a motor car business. Capital $5,000. Incorporators: George Beatty, Arthur B. Beatty and Emma L. Beatty.

Allen & Arnink Auto Renting Co., Albany, N. Y. Capital $5,000. Incorporators: William G. Allen, Henry Arnink and Bertha H. Arnink.

Motor Mail Transportation Corporation, Rye, N. Y. Capital $60,000. Incorporators: J. J. Cassidy, William C. Prime and John L. Crawford.

Eighteenth Street Garage Company, New York City. Capital $5,000. Incorporators: Wm. F. Donnelly, Daniel E. Peel and Abraham E. Magnus.

Kargill Kerosene Engine Company, Utica, N. Y. To manufacture motors, engines, etc. Capital $100,000. Incorporators: Benjamin T. Gilbert, Geo. A. Frisbie and Joseph A. Xardell.

Elsmere Cab & Car Co., Inc., New York City. Auto livery business. Capital $1,000 Incorporators: Eleanor Engledrum, John Engledrum and Mary E. Morgan.

Combination Transmission-Clutch Company, New York City. Capital $10,000. Incorporators: Louis E. Bomeisler, George Isaken and Herman Gustow.

Yellow Taxicab Company, New York City. Capital $5,000,000. Incorporators: Samuel G. Trainor, Benjamin Bag and Lily Robinson.

Amsterdam Starter Company, New York City. To manufacture devices for motor cars. Capital $5,000. Incorporators: Edwin S. Greene, Rufus L. Weaver and Sarah S. Weaver.

Post Road Transportation Company, Hastings, N. Y. To operate motor bus line between points in Westchester County. Capital $100,000. Incorporators: George T. Brown, Cyrus F. Judson and Paul Nicholson Hayes.

Royal Motor Truck Company of New York, New York City. Capital $10,000. Incorporators: Arthur J. Cohen, William S. Weiss and Harry J. Leffert.

The "E.D." Gear Company, New York City. To manufacture gears, etc. Capital $60,000. Incorporators: Daniel J. Rice, James P. Eadie and George Keating.

Eclipse Rubber & Tire Co., New York City. Capital $50,000. Incorporators: Simon J. Schwartz, Arthur A. Glass and Harry A. Bloomberg

Sullivan Garage Company, Inc., New York City. Capital $15,000. Incorporators: M. E. MacAdam, John M. MacAdam and Peter B. Riley.

Eadie Vehicle & Gear Co., Buffalo, N. Y. Capital $200,000. Incorporators: John M Eadie, George P. Keating and Seward H. Millener.

Cedar Auto & Marine Co., New Rochelle, N. Y. Garage. Capital $2,500. Incorporators: Fennell D. Franckling, 89 Chestnut St.; Charles A. McGill and Albert B. McGill.

Kingsbury-Leahy Company, Albany, N. Y. Motor truck and carriage factory. Capital $10,000. Incorporators: Edward W. Leahy, Jacob S. Kingsbury and Sara M. Kingsbury.

Auto Truck Storage & Exchange Co., New York City. Capital $20,000. Incorporators: Henry J. Benjamin, Louis H. Moos and Leopold O. Rothschild.

National Tire Company, New York City. Capital $50,000. Incorporators: Harry Davies, Thomas H. Hopkirk and Ivan V. Weisbrod.

Park Hill Auto Company, Yonkers, N. Y. Capital $15,000. Incorporators: Eric Drewitz, Emil Drewitz and Paul T. Ellenbogen.

B. M. O. Truck Company, Cleveland, O. Capital $5,000. To manufacture motor cars. Incorporators: N. H. Van Sicklen, Sr., Harry N. Fowler and Henry Paulman.

Auto Transportation & Sales Co., New York City. Capital $1,000. To deal in motor trucks and conduct a freight transportation business. Incorporators: Edward E. Manning, William Landseadel and J. Martin Berk.

Taxicab Service Corporation, Portland, Me. To conduct a taxicab business. Incorporators: George C. Whitmore, William D. Sawyer and Elton H. Thompson.

Auto Truck Storage & Exchange Co., New York City. Capital $20,000. To deal in freight automobiles and store them. Incorporators: Henry J. Benjamin, Louis H. Moos and Leopold O. Rothschild.

Dayton Auto Delivery & Service Co., Dayton, O. Capital $25,000. General delivery business. Incorporators: J. C. Hamilton, S. Flatan, W. H. Speckler, Dr. H. C. McClelland and E. V. Menler.

Galion Motor Truck Company, Galion, O. Capital $5,000. To manufacture and sell motor cars, truck parts, etc. Incorporators: J. S. Smith, E. A. Williams, E. A. Shearer, D. M. Yarger & W. L. Hampton.

Ideal Combination Company, Wilmington, Del. Capital $100,000. To deal in trucks, engines, etc. Incorporators: W. Litzenburg, I. S. Morgan and J. M. Frere.

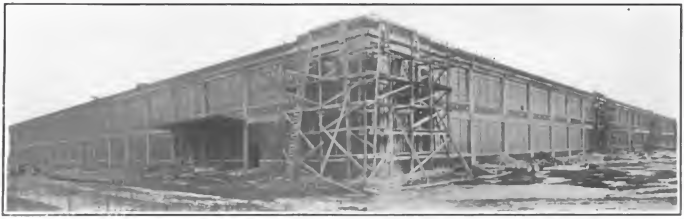
Motor Bus Transit Company, Gary, Ind. Capital $20,000. To operate motor buses. Incorporators: F. M. Stulte, J. F. Cranthan and J. W. Lyddick.

Kedix Newark Motor Truck Company, East Orange, N. J. Capital $200,000. To manufacture motor trucks. Incorporators: G. F. Kallberg, L. L. Dann and R. M. Colcorn.

Commercial Service Truck Company, Grand Rapids, Mich. Capital $175,000. To manufacture motor trucks. Incorporators: Philip Moran, J. W. Laudman and G. H. Greenbauer.

Sigmund Auto Truck Company, Milwaukee, Wis. Capital $50,000. To manufacture trucks. Incorporators: Nicholas W. Marx, N. P. Marx and Jesse L. Stroede.

Terminal Auto Company, New York City. Capital $10,000. Incorporators: Gilbert N. Pearsall, Selwyn J. Kidder, Frank R. Hilton.



Present Appearance of the Hugh New Plant Which the Continental Motor Manufacturing Company Is Building in Detroit

tablished at 1886 Broadway. He will also be in charge of the service building in Long Island City, with F. A. Crooks as assistant.

Miscellaneous Notes

Bosch company has completed the 1,000,000th Bosch magneto. This company was started in 1888.

General Motors Truck Company increased its business 200 per cent. during March, and from appearances will eclipse that record for April.

The Gramm Motor Truck Company of Canada, Ltd., has been chartered in the Province of Quebec. The principal agent is A. L. Jennings & Co., Montreal.

The Alco Company has received repeat orders for five Alco trucks each from the Simmons Hardware Company of St. Louis and T. C. Jenkins Company of Pittsburg.

The Motz Tire & Rubber Co., Akron, O., is issuing 2-year guarantees on its cushion tires for commercial cars.

The line of motor 'buses recently installed upon the streets of Watertown, N. Y., has proved a big success. The cars resemble limousines, carrying 28 passengers each.

Automobile Trade Credit Association recently elected the following members. Class Journal Company, Essex Rubber Company, Hoffman Corr Mfg. Co. and W. E. Pruden Hardware Company.

The Monitor Automobile Works, Janesville, Wis., has brought out a new truck to be known as Model C 112. This is built to meet the requirements of concerns which are obliged to transport lengthy articles, such as long boards, timber, pipe, structural iron, etc.

Saurer motor trucks to the number of 10 may be seen in the illustration on the previous page, this representing part of a recent order for 30 which the International Motor Company has received from the Porto Rico Motor Company. The vehicles are shown near the dock where shipment was made. This firm is establishing a motor truck system of handling freight in the interior of the island in 5-ton loads, the laws prohibiting a heavier single load than 8 tons.

The Packard Company's truck shops have a huge capacity and this is being tested to its limit at present, as the illustration on the preceding page shows. This shows the lineup of a single day's production, that of March 30, when no less than 23 vehicles were finished and shipped. During the month of March the factory shipped 85 per cent. more trucks than in any preceding month and 50 per cent. greater than the corresponding month of last year.

New Commercial Vehicle Agencies Established in April

Place.	Car.	Agent.
Syracuse, N. Y.	Kelly	W. R. Shaw
Detroit, Mich.	Baker Electric	Baker Electric Co. of Mich.
Houston, Tex.	Packard	Young & Dwire
Saginaw, Mich.	Studebaker	Bolton Auto Co.
Wilcox, Pa.	Franklin	F. R. Brown
Dubuque, Ia.	Franklin	Byrne Bros. Tr. & Car. Co.
Wheeling, W. Va.	Franklin	Joseph J. O'Keefe
St. Louis, Mo.	Alco	Missouri Motor Car Co
Durham, N. C.	Alco	F. B. Lyon Motor Car Co.
Washington, D. C.	Alco	Motor Truck Corp.
Porto Rico	Alco	Melch'r Armstrong & Dessau
Allentown, Pa.	Alco	W. & C. W. Angle
Buffalo, N. Y.	Adams	L. G. Schoepflin Co.
S. Bend, Ind.	Adams	Milton G. Smith Auto Co.
San Antonio, Tex.	Adams	Commercial Auto & Rep. Co.
Waco, Tex.	Adams	Waco Auto Co.
Butler, Pa.	Adams	Butler County Auto Co.
Milwaukee, Wis.	United States	Motor Service Co
Victoria, B. C.	Speedwell	Victoria Motor Car Co
Reading, Pa.	Motor Wagon	Park Auto Sales Co.
*Chicago, Ill.	Monitor	Monitor Automobile Works
Matador, Tex.	Franklin	Jack Luckett
New Haven, Conn.	Franklin	Cowles Tolman
Ft. Plains, N. Y.	Franklin	Henry Rebell
Cincinnati, O.	Brush	Central Motor Sales Co
Cincinnati, O.	White	White Motor Car Co.
Winona, Minn.	I. H. C.	International Harvester Co.
Jacksonville, Fla.	Federal	Claude Nolan
Gloversville, N. Y.	McIntyre	J. August Schmidt
Boston, Mass.	Grabowsky	L. S. McCreery
Alexandria, Va.	Board	Everitt Co.
St. Louis, Mo.	Pope	Pope Motor Truck Co.
Somerville, Mass.	Sanford	Brooks & Palmer
Washington, D. C.	Dart	Motor Car Co.
Windsor, Ont.	Lincoln	Windsor Mfg. Co.
Winnipeg, Can.	Commer	Darwen Motor Truck Co.
S. Bend, Ind.	Gramm	M. G. Smith Gar. & Auto Co.
Chicago, Ill.	Stegeman	Charles M. Hayes
Pittsburgh, Pa.	Gramm	A. Deroy Co.
Pittsfield, Mass.	Gramm	Yon Bros.
Redfield, Ia.	Dart	Nelson Bros.
Boston, Mass.	Bessemer	R. G. Howard
Columbus, O.	Modern	Oscar Lear Motor Car Co.
Denver, Col.	Little Giant	Colburn Auto Co.
Scranton, Pa.	Hewitt	Mack Bros.
Chicago, Ill.	Lansden	Lansden Co.
†New Haven, Conn.	Kelly & Baker	Pyramid Automobile Co.
*Springfield, Mo.	Sampson	Herrick & Son
Syracuse, N. Y.	Federal	James Automobile Co.
Chalotte, N. C.	Franklin	Mecklenburg Auto Co.
Mexico, N. Y.	Franklin	Charles H. Everts
Newport, Ky.	Franklin	Fox Automobile Co.

Accessory and Miscellaneous Agencies

New York, N. Y.	M'Keen RR Ca.	McKeen Motor Car Co.
Los Angeles, Cal.	Swineh't Tires	W. B. Guyton T. & Rub. Co.
*Portland, Me.	Goodyear Tires	Goodyear Tire & Rubber Co.
Cincinnati, O.	Ajax Tires	Hanke & Rothe
Boston, Mass.	Motz Tires	Standard Tire & Rubber Co.
Philadelphia, Pa.	Stand. Fabric	Petry-Cassidy, Inc.
Buffalo, N. Y.	Stand. Fabric	James G. Barclay
Detroit, Mich.	Stand Fabric	Fred E. Holmes Co.
Chicago, Ill.	Stand. Fabric	F. E. Sparks
Boston, Mass.	Stand. Fabric	Standard Woven Fabric Co.
New York, N. Y.	Stand. Fabric	Flint & Chester
San Francisco	Stand. Fabric	Fred Ward & Son
Newark, N. J.	Goodrich Tires	Goodrich Tire & Rubber Co.
Philadelphia, Pa.	Motz Tires	Preston & Stubbs
*Los Angeles, Cal.	Diamond Tires	Diamond Rubber Co.
Jacksonville, Fla.	U. S. Tires	U. S. Tire Co.
Denver, Col.	Swineh't Tires	Gessler-Williams Tire Co.

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*Removal. †Additions and Changes.

Contents

June 1912

Trend of the Times in Truck Work—Part V.... 3
Increasing motor truck sales by applying the principles which have made scientific management or efficiency movements or system as it is called.

The Motor Truck in Grocery Delivery. By M. C. Horine.................................. 8
Resumé of retail and wholesale grocery situation in Chicago with regard to the use of commercial vehicle. The work to be done and savings effected by those cars now in active use.

Steel Bodies for Motor Trucks—Part I.......... 12
Considering the use of metals for this highly important part of the commercial car, with their advantages and disadvantages. Presenting the latest, a brewery body in steel and a one-piece cab.

Legislative and Legal Matters of Interest. By X. P. Huddy.................................. 15
Presenting the truck owner's liability for the acts of drivers and the management of his vehicles. The laws of negligence and of the road.

The Editor's Viewpoint......................... 16
Increasing Use of Metals, Sales Methods and Possibilities.

Manufacturers' News of the Month............. 17
Newark's Big Truck Parade, Goodrich and Diamond Companies Merge, Activities of Other Tire Companies, Progress of Massachusetts' Highway Restriction Bill, London Truck Parade.

Commercial Vehicle Tires in England—Part III. 22
Mileages obtained with S. & C. World and Giant tires on London buses, peculiar features of these makes. Continental features and records.

Making Trucks as Done at Packard Factory..... 24
A brief description of the largest factory in the country producing high grade vehicles, with mention of the methods and machinery used. How a truck front axle is fabricated and how long it takes.

Insuring the Commercial Vehicle—Part III..... 30
Résumé of the New York and National insurance situation, also the salient features in all of the other principal states. Jersey's liability law and open dealer's policy. Kentucky's wholesale and retail distinctions.

Present Truck Trade Conditions................. 34
The present conditions of the commercial vehicle business the country over as gathered from the reports of correspondents, agents, dealers and manufacturers. Exceedingly healthy growth.

Latest Thoughts from Leaders of the Industry.. 37
John N. Willys on the present healthy situation, A. R. Warner on the economic aspect of truck sales.

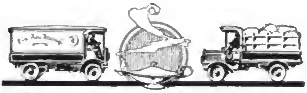
Cost of Operating Commercial Vehicles......... 38
What it costs to use motor trucks in the Wilmington patrol service, in telephone work, in department store service, both trucking and passenger hauling.

New Commercial Vehicles and Accessories...... 42
Lozier 5-ton truck, Palmer-Moore air-cooled three-cylinder two-cycle motor, Col-Mac exhaust heater, Defiance felloe turner.

Miscellany
Fire Company Designs Own Engine, 14; Recent Activities of Western Manufacturers, 35; Brodesser Reorganized and Enlarged, 35; Croxton to Build in Pittsburgh, 35; Universal to Go to Milwaukee, 35; Boston to Purchase Motor Apparatus, 36.

Departments

Commercial Car Questions Discussed........... 20
The Truck Maker's Market...................... 28
Electric Vehicles 32
Mechanical Notes for Truck Drivers............ 40
Municipal Service Extensions................... 46
Commercial Motor Vehicle Patents.............. 47
Trade and Personal Items....................... 48
New Agencies Established...................... 50



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"Used in Every Line of Business"

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(Dobbs-La Hatte Co.)

TORONTO,
Bay & Temperance Sts.
(Dominion Auto Co.)

CHICAGO,
918 S. Michigan Ave.
(Commercial Car Sales & Service Co.)

SAN FRANCISCO,
545 Golden Gate Ave.

LOS ANGELES,
Main & Washington Sts.

Continuous Efficiency Guaranteed

The
COMMERCIAL VEHICLE

Vol. VII June, 1912 No. 6

The Trend of the Times in Truck Work

Increasing Sales by a Survey of the Methods of Other Industries, by the Application of the Principles of Efficiency to the Merchandising of Commercial Vehicles and the Resultant Intensified Effort

Part V—Scientific Management and Truck Sales

Digest of Part V—Sales Methods

IN a consideration of sales methods, attention must be given to the work done along this line in other industries under the name of scientific management, efficiency movement or system.

THIS is no more than the application of common sense and an analytical scrutiny to the problems in hand. Its two basic principles are the consideration of the simplest units and a pre-determination of the standard of efficiency to be upheld. In short, it is necessary to know about every proposition, what is and what is to be, in order to establish a possible efficiency relation between the two.

THE place to spend time and money on work is before it is begun, in short, upon a preliminary investigation, which should determine all future efforts. In this, scientific management gives us twelve principal divisions, under some one of which all effort may be classified and evaluated.

OF these divisions, the most important are Ideals of a High Order, Common Sense and Good Judgment, Competent Administrative Counsel, Reliable Records, Standardized Conditions and Operations and Proper Planning and Despatching of the Work.

THE fundamental principles, the application of which have created such revolutionary efficient methods in modern industrial operation, may be reduced to two, one of which is the planning of industrial activity from the consideration of the simplest units, the other is the pre-determination of standards of efficiency.

THE transportation problem reaches its most complex form in the application of motor trucks and only those who employ scientific methods to effect economy in substituting them for the older devices in use can hope to survive in the competition which can easily be foreseen by any competent observer.

THE avidity with which information on improved methods of conducting sales operations seems to be absorbed by our readers, as indicated by correspondence, has induced us in this issue to continue the subject with considerable extenuation.

As set forth in our last article, **a very certain solution for the efficient conduct of sales effort is found in borrowing from other successful industries, and if we seek for the cause in the most conspicuous example we cannot fail to discover the influence in recent years on industrial administration of what is variously known as scientific management, the efficiency movement, intensified effort, conservation, or system. We therefore cannot do better than discover in what manner we can practically parallel and apply to our own problems the principles which have created such enormously improved results in other spheres of activity.**

To begin with, no matter how mysterious or high sounding the title under which this particular form of mental and physical energy may be designated it can be boiled down, in explanation, to the concentration of common sense on the simplest principles into which any function can be resolved for the purpose of predetermining the least effort necessary to effect the purpose in question. This insures an absolute and effective control and co-ordination of every effort.

How exhilarating and gratifying it would be if we could evolve a system of operation for our sales forces which would guarantee a definite result to the execution of every single movement or expenditure of energy. If we could operate these forces with a military precision to accomplish any predetermined function. If the schedule of effort were so designed that there would be no waste energy or loss of time. Then without question our factories would be flooded with production and the material return to all interests involved abundant and satisfying.

That this condition can be made a living reality is absolutely beyond question, since every element tending to influence its success is impregnated with opportunity to a point of precipitation with the sole exception of the catalytic influence of the salesman, and this we propose to mature to a state of highly active efficiency by first applying an analytic scrutiny which will resolve his desired functions into their simplest constituents and by a synthetic process build up his code of action so that he shall have a definite target for every shot and that his arms and ammunition (so to speak) will be operated with such prearranged methods of precision that he shall hit the mark every time. His failures, if any, will then become as conspicuous as his successes under present methods.

To carry this into practical execution does not require so much organizing genius as a highly sensitive appreciation of the valuable examples which are well within the range of our observation where science applied to business methods has brought about some of our present-day performances, which formerly were regarded as superhuman and impossible.

Observe, for example, the revolution which has taken place in transportation on the great lakes for the handling of ore and coal brought about as an economic necessity in preserving the Northwest as a source of ore supply to the Pittsburgh district as a center of utilization, and, furthermore, in preserving the Pittsburgh district as the source of coal supply to the Northwest. The delicate balance of this really tremendous commerce is this: A very slight barrier would dam up the flood of Lake Superior ore and permit Birmingham to supplant Pittsburgh. A difference of 10 cents a ton in freight rates would let Indiana and Illinois monopolize the Northwest coal market to the exclusion of Pittsburgh.

The lake route, constantly fringing the danger zone, has but one thing to save it—the lake dock—making possible quick loading and unloading and thus preventing the multiplication of ships. Hence 3,000 craft are made to transport annually 43,000,000 tons of iron ore and 23,000,000 tons of coal, grain and lumber with the result of low rates of transportation.

Forty years ago sailing vessels were towed into port with the rowboats and the ore or coal taken ashore by means of wheelbarrows over deep spring planks, requiring 2 days' hard work to unload 250 tons. Ten years later saw an improvement in the shape of a boom rigged to the mast when with rope and pulley attached a half-barrel filled with ore or coal was drawn up and swung ashore by mule power. By this method in 2 days 400 tons could be unloaded. This at the time was a revolution. Twenty years ago this general principle was considerably improved by substituting a steam hoisting engine for the mule and a 1-ton iron bucket for the half-barrel, but even up to 12 years ago it required 2 working days to unload 2,500 to 3,000 tons.

To-day lake ships carry 10,000 to 15,000 tons of any bulk commodity and with the aid of the present-day mechanical appliances with which the modern dock is equipped this tremendous cargo is yanked ashore in 1 working day of 8 hours. **This is efficiency.**

We might cite a more specific example of the accomplishments of scientific management without departing from the operations of coal handling by reference to the important change which has been made in the navy's method of coaling ships whereby this prosaic drudgery has had introduced into it as much activity and stimulus to the imagination as the excitement of modern battle practice. By following method in the collection of data; studying men and operations; fitting men into places they are best qualified to fill; determining standard times for individual operations; developing team work and bringing team operation up to the highest attainable speed, coupled with absolute precision, and providing sufficient incentive to secure the best efforts of officers and men, the rate of coaling ships has been raised from 30 to 200 tons of coal an hour as an average rate and a record of 550 tons for the best hour under test practice.

We may take again the navy for another conspicuous example in its modern gunnery practice developed under the methods referred to, where scientific training has been employed since 1902. Under 3 per cent. of all the shells fired at the battle of San Diego hit the enemy and there is no record that a single 12-inch or 13-inch shell took effect. The ranges were less than 3,000 yards. Recently the New Hampshire, using the old "Texas" as a target, fired at lengths from 10,000 to 11,500 yards and landed whole salvos on the "Texas" whenever she wished. More recently in battle practice the "Michigan," an all big-gun ship, made 22 12-inch hits at ranges of about 10,000 yards while steaming at 15 knots, the target being only 60 feet long and 30 feet high. She fired 48 12-inch shells, the percentage of hits therefore being about 45, a remarkable increase in percentage above the 3 per cent. previously referred to.

The growth of competition has enforced these highly specialized performances as unavoidable necessities in the older business lines and it is a natural speculation that the competition will render them equally unavoidable in the motor truck industry; in fact, our condition to-day has all the superficial evidence of competition, but properly diagnosed, we are instead suffering from congestion. There is no dearth of energy and activity, but it is so unscientific, untrained and misdirected as only to cause confusion and constitutes such an impediment to our rational progress as to demand immediate research and reform, and those who will first undertake the solution of this problem will have an extraordinary advantage and a corresponding reward.

In taking advantage of that body of principles the application of which has created such revolutionary efficient methods in modern industrial operation, we must first acknowledge our indebtedness to the brilliant efforts of Taylor, Emerson, Church and Gantt, and others who have been the real captains of industry in the application of their psychological diagnosis to the commercial administration of the mechanic arts. Their theories, published broadcast, have been put into practice so extensively and demonstrated so conclusively that negligence of the lessons thereby taught us would be inexcusable in any sensible inquiry of this character and we propose to use them to the utmost advantage.

These basic principles may be reduced to two:

"One is the planning of industrial activity from the consideration of the simplest units; the other is the pre-determination of standards of efficiency.

"When we know exactly what is and also exactly what ought to be, we are able to establish a direct efficiency relation. By appropriate comparison of what is and what ought to be, efficiencies, both ideal and practical, can be established. To ascertain what is, to establish standards, and to bring the actual up to the standard, requires all sorts of knowledge, experience, efforts, methods, devices, accumulated during the past ages or newly evolved." In other words, if we can resolve all that may be desirable in our sales operation into its fundamental elements or simplest units we can then pre-determine upon our methods of maximum performance, creating intensified effort and the elimination of waste. The results accomplished accordingly will be the greatest possible realization and the cost of such the least, consistent with the character of effort expended. Coincident with this there would be a complete disappearance of listless guess work, spasmodic and intermittent energy, indefinite procedure, dodging of responsibility and the manufacture of excuses for failures.

It must be admitted that this is a problem entirely devolving upon the sales administration, aided and assisted by its executive specialists, with anticipation of results from the active operatives or salesmen in the sales field only in proportion to the extent to which the administration can utilize them as the means of carrying out its pre-determined purposes.

This is another of the basic lessons which we learn from the study of this science applied to business methods and is referred to frequently as **the co-operation necessary between the staff and the line in a properly constituted organization.** Students of history are quite familiar with the character of military organizations, and the inter-relation of the **line and staff** as well as the remarkably different results which have been obtained from the **newer** methods of paralleling or supplementing the activities of the line with the highly specialized aid of the staff as against the **older** practice of delegating responsibility, **in series, from one office or to another and relying upon the line alone, for the performance required, unaided by any member of the staff except the officer directly in command of their operations.**

In modern organizations the staff is composed of a collection of specialists who are individually trained or qualified in some particular requirement of the administration, so that each member may support the chief of staff, with some specific knowledge or equipment, in his direction of the line, so that the latter can be utilized to carry into effect the particular project desired by the chief.

In our own industrial organizations the chief of the staff is the principal executive delegate to represent the administration, the staff being composed of the subordinate executives, each a specialist in some particular division of the organization's functions, such as production, sales, design, purchase, accounting, etc., while the line is composed of the factory operatives in the production division, and the sales operatives in the merchandising division. Our purpose should be so to constitute our organization and conduct the performance of its functions that each of the line operatives can have applied to his methods of operation all the aid, information and specially qualified assistance that the staff in whole or in part can render, under the influence and direction of the administrative. This transfers responsibility for the performance of the line to the administration, where it properly belongs, and brings to the assistance of the line operatives the powerful assistance of all the influence and resources in the organization.

The problem in hand, therefore, is an extensive one "for which there is no formula or secret of success that can be stated in a sentence. **Attention and work** are the secrets so far as one can indicate them in advance. But attention calls for the study of details and work requires careful application. Hence the first consideration is an analytical reflectiveness which begins at the beginning and leads on and on. Efficiency indeed is not so much a question of time and compactness as of thought, together with the right use of the resources at hand."

"The place where it pays to spend time and money on work is before it has begun," and we should set out in our investigations of the proper means to employ in merchandising motor trucks with a deliberate cautiousness which will insure a complete review of all the means available for the accomplishment of our preconceived ends.

In this review we cannot do better than select for imitation the 12 divisions into which scientific management has been resolved by one prominent advocate, Harrington Emerson, as follows:

1—Ideals.
2—Common-sense and judgment.
3—Competent counsel.
4—Discipline.
5—The fair deal.
6—Records, reliable, immediate and accurate.
7—Planning and despatching.
8—Standards and schedules.
9—Standardized conditions.
10—Standardized operations.
11—Written standard-practice instructions.
12—Efficiency reward.

If we follow the foregoing principles and doctrines of the particular science under consideration as they have been propounded to us we will begin by establishing a definite conception of the results for which we intend to strive. Our motor truck product for the year, for instance, may be limited to a specified number of machines in one or more varieties and sizes and our procedure will therefore be governed by these limitations. It will be futile to lay down our operations and expenditures upon a campaign which is out of proportion to our production, even though we have in mind the ultimate development of a much larger business. The propagation of the motor truck industry will naturally be shared by every producer in the business with a consequent distribution of the burden, so that our portion of the necessary missionary work should be regulated with relation to our expected return.

1—**With the margin between the production cost and the market value as the basis of consideration,** we can determine upon what proportion of this can be expended for exploitation and this in turn will gauge the range of our activities and the nature of the devices which we are at liberty to employ for these purposes. Thus if we are decided on a certain sales organization and the advertising literature and other auxiliaries with which this is to be supplemented, our next step will be to resolve upon the means with which these can be developed to the highest efficiency.

2—Judgment of a high order will often be necessary in selecting the members of the sales force as the functions which each salesman will be called upon to perform, even when backed up by the co-operation of the entire organization, are so varied in a new industry of this kind as to call for good education, stability, personality, an educative faculty as well as a common-sense knowledge of human nature.

The nature of the advertising and literature will also demand good judgment in the determination of its character, as **this is the permanent medium of communication between the organization and the prospective purchaser.** Its composition should convey information in every line and should constantly tend to lead the reader to the viewpoint necessary to efficiently apply the new device as differentiated from the practices to which he may at present be accustomed.

3—Competent counsel will be the next requirement of the administration in the conduct of sales, since the study and investigation necessary to apply machinery of this class efficiently is so comprehensive as to be well beyond the range of the ordinary business man and calls for specialization in a high degree. **The transportation problem reaches its most complex form in the application of motor trucks and only those who employ scientific methods to effect economy in substituting them for the older forms or devices in use can hope to survive in the competition which can easily be foreseen by any competent observer.** But the problem of the actual machine application is not the only one on which counsel is desirable. All of the functions which enter into the first presentation of the matter to the prospect, the subsequent negotiation and the final consummation of each important sale demand especially qualified assistance, which if procurable is well worth a high price as insurance against the misapplication of the expenditures.

The member of the staff employed for this purpose will be the most conspicuously useful in view of the fact that this is the part of the business least known and it has nothing like the definite aspect of the production, purchasing or other departments.

4—The next aid to the administration is a rational discipline extending to every member of the organization which will insure that each of the practices put into execution will be faithfully and continuously carried out. This is the real crux of organization in its modern form and the incentive for its fulfillment should be the entrancing stimulus of the desire for success. This kind of discipline is entirely devoid of rigor or severity and on the contrary is that unconscious co-ordination which is the automatic result of implicit belief in the administration and the success of its methods.

The economic demand for this type of discipline is imperative, for "once interested in putting all our powers into one thing in such a way as to bring satisfaction, possibilities without number will be open before us." This bespeaks absolute executive control and a flexible, responsive equipment of effort to be applied wherever good judgment may direct.

5—**Inter-related with the foregoing should be a reciprocal disposition to deal fairly with the active operatives or salesmen.** There are many occasions when notwithstanding the most intelligent and persistent effort on the part of the sales force the amount of responsive business is inadequate for the expenditure involved. However, each case of failure should be capitalized upon as well as each success. The experience gained can be utilized in dealing with subsequent prospects of a similar nature. Furthermore, each instance of failure calls for investigation on the part of the administration for the purpose of verifying the efficiency of the effort expended upon it and devolving, if possible, improved performance in the subsequent cases, probably demanding a complete change of tactics which perhaps the executive alone can solve. The remedy may thus be applied to the cause instead of the symptom.

6—The desirability of records, reliable, immediate and accurate, is too evident to require much commendation. **"Progress from inefficiency to efficiency can be measured only by comparative records. Lapses from efficiency, spurts towards efficiency, must be immediately reliable and adequately recorded. Records that do not serve this purpose may have value as tombstones, or as monuments commemorating triumphs, but very indirectly do they further efficiency."**

Records are a vital means of control to the executive as frequently they constitute the only means by which he can gauge the performance of his operatives. Their design and the means of their execution calls for talent of the most efficient character, they should be laid out with a high regard for a conservation of both time and energy, and are in most cases condemned to failure at their very inception from their cumbersome provisions for non-essential data, and are thus frequently liable to either neglect, or exorbitant expense for their upkeep.

7—The next principle of interest in scientific administration is of planning and dispatching, and **this develops the desirability of studying in advance all the conditions to be encountered in the execution of our**

work, and in the instance of sales operation it takes into account every function which the salesman is likely to perform in his presentation, negotiation and consummation of sales.

An intimate knowledge of all the details of operation will place the administration in a position to pass judgment on what ought to be carried out and what could be consistently omitted, and thus determine in advance on a code of action which would best conserve the salesmen's energy and consequently apply it with greater intensity in whatever action is determined upon. This process practically substitutes the judgment of the administration for that of the individual with all the advantage of the accumulated experience of the administration in handling organization work against the limited individual experience.

The time of his calls or their repetition may also be determined upon, and there is thus the assurance to the organization that a systematic and persistent effort is being exerted upon its prospects and such control exercised that the more important issues may be handled with the assiduity which imminence may demand while the cases of lesser significance are receiving appropriate attention.

With the control thus transferred to the management there is advantage on both sides, as the salesman is made to feel his more effective part as a unit of the organization's functioning rather than an isolated performer on his own responsibility with its corresponding disappointments and inefficiency.

8—**Another set of principles is standards and schedules for sales operatives. These contemplate the establishment of definite specified results in the performance and in the time necessary for particular accomplishments.** The administration is thus able to gauge the progress being made and the state of efficiency or inefficiency resulting from the methods which it has put into practice and is responsible for.

Many of our motor truck institutions are operated so indefinitely that the question of success or failure cannot be determined until it is often too late to effect retrenchments of one kind or another which might have brought about improvement.

A definite and precise understanding of what is expected and on what schedule it is expected is frequently an encouraging stimulus to healthy activity and the realization of the predetermined performance.

9—**Standardized conditions, an underlying necessity to the efficient operation, do not readily appear applicable to the marketing of motor trucks until we consider how many salesmen are operating at a disadvantage through a lack of knowledge of the requirements of the prospects they approach.** We frequently find effort wasted in soliciting business from concerns that are not interested from a variety of reasons. They may not use transportation equipment at all, or may have extremely favorable contracts for service, or have a character of work which will not admit of the economic substitution of motor trucks.

It is well within the range of possibility for the management to procure advance information of the conditions which surround all of the prospects whom they desire the salesmen to approach, and furthermore, to so communicate with these by correspondence, literature, statistics and other means of generating interest as to provide the most favorable conditions and a welcome reception to their representatives. The great waste which otherwise occurs would readily pay for securing this advance information.

10—Standardized operations naturally follow standardized conditions, and these consist of reducing to a definite mode of action all the functions to be performed in merchandising trucks. This is effectively done in other lines and can unquestionably be carried out in ours. It is actually in force with those salesmen who concentrate their efforts on some particular lines of trade, such as breweries, grocery and packing houses. By repeatedly interviewing men on one line a limited number of peculiarities develop which make the experienced salesman particularly adept in conducting the negotiations and reducing his operation to a very limited performance. The cases become easy to him as he progresses and determines for himself a very definite procedure with the expenditure of the least time and the least effort.

This character of work, however, calls for administrative genius of a calibre which has been effective elsewhere in minimizing human effort and reducing merchandising processes to organization functions.

11—**Written standard practice instructions should constitute the means of constantly keeping evident before the operatives the decisions of the administration and their modes of execution.** This visual evidence of what is expected would be an insurance against any misconception, and in fact has been found a matter of necessity in securing consistent performance and continual effort in the desired direction.

It has been well recognized that the human memory has its limitations and cannot be relied upon to effect a precise system of performance over an extended period without modification. Without a written code the salesman is quite likely to substitute his opinion or judgment for that of the organization simply because his performance through some unobserved defects has not brought about the realization expected.

12—Last, but not least, is the efficiency reward which is certain to endow even the least effort in the direction of efficiency. **"We are passing out of the period of carelessness and wasteful use of our resources and entering a period of conservation and scientific management. We are dividing and subdividing human labor that we may place each man where he may work best. Specialization is being carried to a point never before dreamed of even by devotees of Utopian schemes. The age of organization has come as a logical result of an age in which the central idea was evolution. Having enjoyed many of the benefits of a rich period of development in the world of scientific invention and discovery we are now proceeding to use our resources so as to take full advantage of the machinery thus put within our power."**

The Motor Truck in Grocery Delivery

The Retail, Wholesale and Commission Grocery Situation in Chicago with Brief Mention of the Commercial Vehicles Now Used in This Work and the Savings of Time and Money They Are Effecting with Extension of Area

By M. C. Horine

IS THE motor truck suitable for the grocery trade in large cities?

Many retail grocers are not decided on this matter; they acknowledge that the motor is admirably adapted for the wholesale grocery field, for the truck gardener field but they question the economy of using the gasoline or the electric delivery wagon in house to house distribution of groceries. They question the application of the vehicle to this service because of the number of stops on each circuit of delivery to customers. The retail grocer with his store in the residential section of the city and having all of his customers within a short radius of his store thinks he cannot use the motor vehicle; but on the other hand the retail grocer with his big store in the downtown or business section and having customers scattered throughout the entire residential community representing perhaps an area of 5 or 10-mile radius can utilize it to good advantage.

The only way to determine if the motor vehicle is suitable for retail grocery trade is to examine cases in which the motor is being operated successfully at present. There are scores of examples in both the wholesale and the retail fields. One downtown Chicago retail grocer, located within the loop district, and having customers within a 10-mile radius on the north, west and south sides of the city adopted motor trucks 6 months ago because the horses could not do the work. This grocer substituted four 1.5-ton trucks for 12 horses and wagons and the motors are doing more work and increasing the business. On its present basis of operation the grocer estimates an annual saving of over $600 a year in delivery and in addition is gradually extending his business, in a way impossible with horse equipment.

Demonstrating the Adaptability of Motors

To demonstrate the adaptability of a motor vehicle for a retail grocer in a residential section, take the case of one located on 63rd street, Chicago, which is 8 miles from the center of the city and on the south side. He uses a 1.5-ton truck on long-distance delivery work. It has been operating for 1 year and while no better time can be made on a delivery route than with horses he is able to carry heavier loads and make more deliveries. The extra deliveries have resulted in increasing his business. With a horse and wagon he could make 100 to 120 deliveries a day close to the store whereas with the truck he makes 200 a day covering 40 miles. But in addition to this retail work the motor makes a morning trip to the wholesale grocery market on South Water street 9.5 miles away, which trip was impossible with the horse equipment. This wholesale trip is made three times a week.

In the following paragraphs a complete analysis of the grocery situation in Chicago is given showing as it does the present motor equipment in wholesale, retail and truck garden field. Examples are cited covering nearly every type of grocer and cost figures where given are not speculations but figures taken from actual cost of operation.

Chicago is a city of great distances, the chief residence districts being over 6 miles from the business center, while the union elevated railroad loop, which constitutes this center has, to a large extent, kept the bulk of its commerce crowded within its narrow confines of approximately 1 square mile, with the result that in spite of the large area covered by the city in relation to its population, the streets, where the most actual business is done, are among the most congested in any city; indeed the corner of State and Madison streets, the center of this great traffic, is reputed to be the busiest corner in the world.

This condition has had a very marked effect on the grocery business, since transportation is such an important element in the handling of perishable foodstuffs. Wholesalers find that, in order to give grocers located from 5 to 15 miles from their warehouses the service that conditions of competition demand, long tedious hauls are inevitable, involving, if horses are used, much loss of time of expensive help and equipment. Especially difficult is this service to perform when the snows are deep or in very hot weather. In motor trucks, those who have tried them have found a relief from such impediments, and a source of surprising, and in many cases, unlooked-for economy.

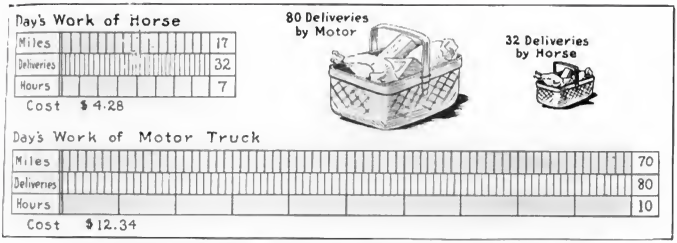
Grocers Realizing Need for Speed

Retail grocers are beginning to realize that in order to do a large volume of business, a wide territory must be covered in delivery. With horse equipment, this entails a large outlay for horses and drivers and stabling facilities therefor, with no more return for the service afforded. Also that a horse has practically accomplished a day's work in marketing alone, and therefore they must choose between maintaining special equipment for this service, paying cartage companies to haul the goods purchased at the wholesale market for them, or depending upon wholesale peddlers for the bulk of their fresh fruits and produce, as it is impossible for a horse to do an efficient day's delivering after from 10 to 20 miles of heavy hauling in the early morning. Surely no economy is to be gained by either of the first two courses, and certainly no grocer can afford to deny himself and his customers the mutual advantages of trade on the open produce market. Especially not if his competitor, by the use of the motor wagon is able to enjoy such an advantage. Nor need he, for with the present low prices of economical and efficient light delivery trucks, they are easily within the reach of any average sized grocery establishment.

Magnitude of Business in Chicago

Some conception of the magnitude of the grocery business of Chicago may be obtained from the fact that there are over 3,000 retail groceries in the city, 71 wholesale grocers, over 350 produce commission merchants, many large dealers of spices, luxuries, grocery sundries and specialties, and probably as many peddlers, wholesale and retail, as grocers.

The wholesale produce trade occupies about 2 miles of



Graphic Analysis of the Relative Mileage, Number and Quantity of Deliveries by Horse and Motor Wagon

streets in the downtown district with room for approximately 2,000 vehicles at a time. From 5,000 to 19,000 vehicles are employed in the daily traffic of this trade, according to the observations of the Chicago Association of Commerce, and the annual business done amounts to over $2,000,000.

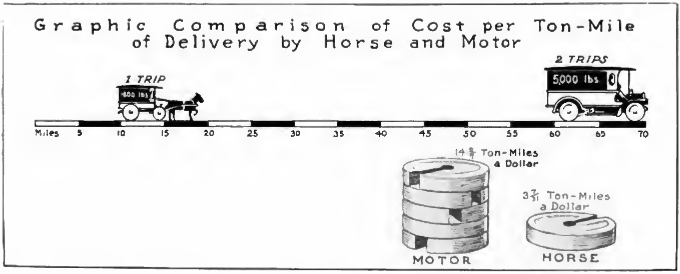
Of the number of grocers who market at South Water and West Randolph streets, the two wholesale grocer sections downtown have their goods hauled away by teaming or express concerns, and it is believed by South Water street dealers that of the total number of grocers in Chicago, 75 per cent. buy their fresh fruits and vegetables from peddlers. Indeed, owing to the distance that the average residential grocer is from this wholesale market, this practice has rooted itself so firmly in the grocery trade of Chicago, that peddlers have risen from the humble estate of buyers of left-over and inferior goods, for sale from house to house, to landed plutocrats, owning fleets of motor trucks, having substantial grocers for established customers, and are by all odds the largest buyers on the wholesale market. Indeed so have they prospered because of the poor transportation facilities of the average retail grocer, and the congestion of the business district, that it is conceded by South Water street commission merchants that they control the market, buying daily and in large quanities.

While it is true that the grocery trade in Chicago has made numerous attempts at alleviation of these conditions, so obviously against the interests of the grocer, such as the establishment of wholesale groceries and produce commission houses in semi-suburban communities such as South Chicago, Englewood, and the northwest side, large grocers and those operating branch houses, who depend entirely upon horse, keep special horses and wagons for the hauling and distribution of bulk produce, while the smaller ones hire cartage companies to do this teaming for them, or buy of peddlers.

Types of Trucks Now in Use

The prevailing types of trucks in use in the grocery trade today are: For wholesale grocers, produce merchants, and wholesale peddlers, the heavy type of from 3 to 5 tons capacity; and for retailers, and for delivery and marketing for small stores, light weight delivery cars of from 800 to 1000 pounds capacity, and the medium-weight trucks of from 1 ton to 1.5 tons, as auxiliaries for marketing and distributing, and long-range deliveries—for the larger retail stores. Few electrics are as yet used, owing, no doubt, to their greater weight and first cost, although with the recent improvements that have been made, there is doubtless a field for them.

Among wholesalers, who use trucks in their delivery are, Sprague Warner & Co., McNeil & Higgins, W. M. Hoyt & Co., and F. C. Weber & Co., wholesale grocers; Thomson & Taylor Co., and John T. McLaughlin & Co., coffee and spice merchants; Booth Fisheries Company, fish dealers; Fox River Butter Company, and Geo. W. Linn & Son, dealers in butter and eggs; the Hazel Pure Food Company, wholesale grocers and operators of a chain of 36 retail groceries; the Nuway Grocery Company, wholesale dealers in grocery



Graphical Comparison of Cost of Motor and Horse Delivery, Showing Ton-Miles Carried a Dollar Expended specialties; the Kellogg Toasted Corn Flake Company; and L. A. Budlong Co., truck gardeners.

Some of the Users and Their Trucks

Sprague Warner & Co. use one Diamond T, and two Reliance trucks of 5 tons capacity each, for delivery to retail grocers. Only a few of their customers haul away their own goods, the majority of which number are owners of motor trucks, and do so in preference to waiting for the regular bi-weekly call of the wholesale truck. The trucks are worked to as near their full capacity as possible, at all times, rented horses taking care of all excess work of rush days, the part handled by them fluctuating from 5 to 50 per cent. of the whole work done.

W. M. Hoyt & Co. have just purchased one 3,000-pound and three 3-ton White trucks for similar service to which the trucks owned by Sprague Warner are put, after having satisfied themselves of their superiority over horses in points of efficiency and economy, by renting. Eleven teams are still owned, and from four to five teams are occasionally hired to care for the excess work. The large trucks, which are used for delivering, make two trips a day with an average load of 7,000 pounds, making 20 deliveries. Two calls a week are made to the average customer, and a radius of delivery of 10 miles is covered. The smaller truck is used for special deliveries and freight pick-ups.

Thomson & Taylor have used a 5,000-pound Reliance for nearly 2 years, to take the place of three horses and wagons, and they expect to do away with horses entirely. They are undecided as yet whether to buy three more 3-ton trucks, or eight of 1-ton capacity.

The Fox River Butter Company, during the bad snows of last winter, purchased a 1.5-ton Grabowsky because the horses were unable to give satisfactory service under the conditions. The truck is used for long runs to Evanston, Logan Square, and Oak Park, making 1-day runs to each, twice a week. The average load taken from the creamery is 2,500 pounds, and an average of 30 miles is traveled a day. Fifty-four stops are made on the average, all well within a 10-hour day. Two men are sent with the machine, a chauffeur and a butter salesman, the former being paid $20 a week, and the latter on a commission basis.

F. C. Weber & Co., wholesale grocers in Englewood, have used a 3-ton Harder for over a year, and three 1-ton Little Giants for 6 months. The latter average five trips, 50 deliveries, and 70 miles of travel a day, a full ton being taken from the warehouse at every trip. Two more Little Giants have been ordered, and the 3-ton Harder is being traded for another of the same make of 5 tons capacity. They use 13 horses at present, driven in teams, one horse being held in reserve, whereas before the purchase of the trucks, 28 horses were required to handle a trade of not so large volume. The horses now in use will be dispensed with as soon as the condition of the streets permits.

Other extensive users of motor trucks are: Irwin Bros., and Magner & Winslow, grocers catering to hotels and restaurants. But it is with the retail grocer that this article has chiefly to do.

Cost of Operating One Service

One of the largest users of motor trucks in the retail grocery trade in Chicago is the Randolph Market & Grocery Co., located in the loop district. Mr. Pruitt, the manager, says that they adopted motor trucks because they found their horses unable to cope with the demands of their delivery service. Six months ago, four White 1.5-ton trucks were installed, and are now improving on the work formerly done by 12 horses and wagons, including the increased trade, that they have been instrumental in obtaining. Two horses and wagons are still used, pending the delivery of a fifth truck.

In general Mr. Pruitt has observed that a depreciation of 20 per cent. may be allowed on the trucks consistently, whereas a percentage of depreciation of from 10 to 50 per cent. is to be allowed on the average run of horses, such a fluctuation being a matter quite regardless of price. His motor trucks make two trips a day, an average of 40 deliveries, 10 freight pickups, 35 miles of travel, and 5 hours of time each trip. The horses, on the other hand, can make but one trip a day, averaging 32 deliveries, in 16 to 18 miles of travel, and in 7 hours time. The radius of delivery by motor is about 14 miles north and south, and 12 miles west, while with horses, no larger radius than 7 or 8 miles could be served satisfactorily. The trucks leave the store regularly with an average load of 2,500 pounds, while the horses are restricted to about 1,600 pounds.

Comparative annual costs are:

Cost of one truck	$3,500.00	
Interest on investment at 6 per cent		$210.00
Amortization at 20 per cent		700.00
Insurance		140.00
Repairs at $100 for 6 months		200.00
Tires at 2 cents a mile, 70 miles a day, 300 days a year		420.00
Driver at $20 a week		1,040.00
Helper at $9 a week		468.00
Gasoline, oil, and garage at $1.80 a day		324.00
Cost of one truck a year		$3,702.00
Cost of three horses, wagons and equipment at $450 an outfit	$1,350.00	
Interest on investment at 6 per cent		$81.00
Depreciation, at 25 per cent		337.50
Repairs at $1.50 a week each		235.00
Three drivers at $15 a week each		2,340.00
Hay, feed and stabling at $5.50 a week each		858.00
Cost of three horse outfits a year		$3,851.50
Cost of one truck a year		3,702.00
Saving on one truck		$149.50 × 4
Saving on four trucks		$598.00

This saving, while actual, is of course, secondary in importance to the fact that improved service has resulted from the use of the trucks, and increased trade has been obtained because customers at a distance know they can get downtown prices and quality with as prompt delivery as the local grocer can afford them.

Utility of Converted Touring Cars

C. Jevne & Co., downtown retail grocers, bought a rebuilt Alco, converted from a touring car chassis, a year ago, and have since purchased another like it. These trucks have a capacity of 1,200 pounds, and have taken the place of three two-horse wagons. Thirty-five horses are in use by this store, and the average daily performance of a two-horse wagon in similar service to the trucks is 35 deliveries in one trip a day, covering a distance of 30 miles, and 7 hours time, while the machines make two trips a day, and 75 deliveries in 60 miles of travel, in 10 hours. The trucks are used in a radius of 8 miles, although, did the trade require, a much larger territory could be taken care of, while the horses are unable to cover a radius of more than 5 miles. They find that with the motors they can rely on the same service in extremes of temperature as at other times, and can plan their routes without consideration of the element of fatigue. They consider the improvement and increased range of service afforded by the trucks, as well worth the extra outlay, and expect to buy more trucks in future. They find that horses are out of service about 75 days a year.

Stanton & Co., one of the oldest and most conservative downtown grocery establishments in the city, purchased a Studebaker electric wagon of 1,500 pounds capacity, 2 years ago, to displace a two-horse wagon, and 6 months ago another of 1,000 pounds capacity. Before the adoption of these trucks, their limit of delivery north was Wilson avenue, 8 miles away, to which they made one trip daily. Now they run to Devon avenue, 11 miles north in the morning, and back to Wilson avenue in the afternoon. Each wagon makes an average of 45 deliveries a day. The smaller wagon is used for deliveries south, and makes deliveries 9 miles distant from the store, twice a day. The average time consumed in making these runs is 7 hours, the future growth of the store being thus well provided for. The average length of stops is 3 minutes.

Mr. Stanton says that while no economy is effected over the cost of the horses formerly used, the real value of the trucks as a factor of business is much greater, because of the increased and more satisfactory service rendered by them. And while considering the cost alone, no advantage is seen, considering their general effect on the trade they are invaluable.

But 14 days out of the year are lost, on the average, on account of deep snows, when horses are used, the horses being rented out on a farm the remainder of the year. Mr. Stanton has found that his electrics cannot be operated economically in the congested loop district, and for this use a horse and wagon is maintained. Seventeen hundred and fifty dollars covers all actual yearly costs of the machines, not including interest, depreciation and insurance.

Before dealing in detail with the successes of retail residential grocers, the reader should remember that roughly speaking Chicago is a huge oblong, twice as long as it is wide and its length over 20 miles. The loop district is in the middle and at one side of this oblong. This leaves three big residential sides to the city the north, the west and the south. Lake Michigan is on the east.

M. Fecher, 1344 E. 63d street, on the south side, 8 miles from the loop, who operates two stores, has used a 1.5-ton Wilcox for a year on long delivery runs, marketing, distributing to the branch store, and local delivery between times. It is found that while no better time can be made in the latter service than is made by horses, more trips can be made a day, and heavier loads carried. Thus an average day's work for a horse embraces from 100 to 120 deliveries a day, close to the store, while the truck makes 200 deliveries, in 40 miles, in six trips, in addition to marketing at South Water street, 9.5 miles distant, three times a week, and distributing to the branch store.

Cost Figures from the South Side

Estimating the cost, Mr. Brown, the manager, finds for a year's time:

Insurance	$100.00
Repairs	200.00
Tires at 2 cents a mile, 40 miles a day, 300 days a year	240.00
Driver's wages at $18 a week	936.00
Helper's wages at $12 a week	624.00
Gasoline, oil and garage, at $3.50 a week	182.00
Cost a year of truck	$2.282 00
Approximate cost a year of triple horse equipment	3.750.00
Saving	$1.468.00

C. H. Morgan & Co., 364 and 1104 E. 47th street, 6 miles south from the loop use four 1000-pound Internationals and four Flanders 20s in the delivery service of the two stores. The Internationals are used for the shorter range deliveries, and the Flanders for marketing, distributing, and long-distance deliveries, some of which are in Evanston, 19 miles north of the Kenwood stores. It is claimed that the Internationals make nearly 200 deliveries a day on the short runs, with 15 return trips to the store.

The Transit House stores, at the Union Stock yards, 6 miles from the loop disposed of seven horses and four wagons when they bought two Mercury trucks; these trucks do more work, and do it better, than the old equipment ever did, and at a considerable saving, as is shown below. A large part of the trade is with people doing business in the yards, but living at a distance from it, and they regularly deliver to customers 3 and 4 miles distant from the store, 4 miles being often traveled continuously without stops. Two horses and wagons were used for this branch of the service formerly a third for a considerable hotel and restaurant trade, and a fourth, a double wagon, for marketing and ice. Two horses had to be held in reserve the year round. Of the two trucks that handle all of this work now, one is used for the hotel and restaurant service, and the other takes care of all deliveries and goes to market twice a week, before the first morning delivery. The stock yards are 7 miles from the produce market, and the run is made in 1.5 to 2 hours according to the length of time spent at the city. Ordinary grocery boys are sent out with the cars, and so much time do they have, besides the time spent in delivering, that the service of one clerk, formerly required is dispensed with.

Another Set of Cost Figures

Computing the yearly costs, the following showing is found:

Cost of two Mercury trucks	$1.600.00	
Interest at 6 per cent		$96.00
Depreciation at 20 per cent		320.00
Insurance		28.50
Repairs and painting		100.00
Tires		144.00
Gasoline, oil, and garage at $6.05 a week each		629.00
Two drivers at $50 per month		1,200.00
Cost a year of two trucks		$2,517.50
Cost of seven horses, four wagons, and equipment	$1,860.00	
Interest at 6 per cent		$111.00
Depreciation at 20 per cent		372.00
Repairs and painting		200.00
Four drivers at $40 a month		1,920.00
Hay, feed, and stabling		1,368.00
Salary of extra clerk at $40 a month		480.00
Cost a year of seven horses and four wagons		$4,451.00
Cost a year of two trucks		2,517.50
Saving		$1,933.50

This remarkable saving demonstrates that for retail work, the smaller sizes of light delivery cars are best adapted.

Thos. G. Moore, 728 West 43rd street, 5.5 miles from the loop, has used a 1000-pound International for 1.5 years. It has only been in the repair shop once, and at a loss of but 2 days' time. In addition to handling the local deliveries, his car has been the means of gaining and retaining trade that he would not think of trying to handle with horse equipment, this trade being with customers who have moved out of his district, but whose patronage he is able to retain because of the long range of delivery afforded by the motor truck; the customers preferring to trade with him because he can make such timely suggestions as can only one well acquainted with their special requirements and preferences, because he knows their favorite cuts of meat, and because established credit may be continued.

What the Indiana Market Pays Out

The Indiana Market, Stone Bros., 215 E. 43d street, 5.5 miles from the loop, has displaced three horses and wagons with a Flanders 20. Loaded with from 500 to 600 pounds, 11 trips, 160 stops, in 45 miles of travel are made a day. Two men are sent out with the machine, which is the secret of the great facility indicated by the above figures. Both are experienced delivery boys, having driven the wagons formerly used, and both are familiar with the operation of the car. The following economy is being effected by the change:

Cost of Flanders "20"	$825.00	
Interest at 6 per cent		$49.20
Depreciation at 20 per cent		165.00
Insurance		115.00
Repairs and painting		100.00
Tires at 2 cents a mile, 45 miles a day, 300 days a year		270.00
Gasoline, oil, and garage		200.00
Two drivers at $14 and $12 a week		1,352.00
Cost of truck a year		$2,151.20
Cost of three horses, wagons, and equipment	$1.170.00	
Interest at 6 per cent		$70.20
Depreciation at 20 per cent		234.00
Insurance at $20 each		60.00
Repairs and painting		105.00
Hay, feed, and stabling at $3 a week each		468.00
Drivers at $10, $12, and $14 a week		1,872.00
Cost of three horses and wagons a year		$3,979.00
Cost of one truck a year		2,151.00
Saving a year		$1,828.00

(*Concluded on page 36.*)

Steel Bodies for Motor Trucks

A Consideration of the Use of Metals for This Highly Important Part of the Commercial Vehicle, Showing Their Advantages—Some Present Forms and Future Possibilities—Weight and Money Savings

Part 1—Steel Brewery Bodies

THE modern manufacturer of motor trucks is constantly on the alert for anything which will enable him to turn out a complete product that is more salable, and perhaps costs less, that after the sale will do better work continuously and thus give more complete satisfaction and lead to reorders. As solving what has been a serious problem, and giving all this to both manufacturer and user, the steel body is presented. As will be shown, this has so many advantages to all concerned that the trade, knowing all these, will insist upon its instantaneous adoption. The prediction is made that in 5 years all or at least the majority of commercial vehicle bodies will be built of this material.

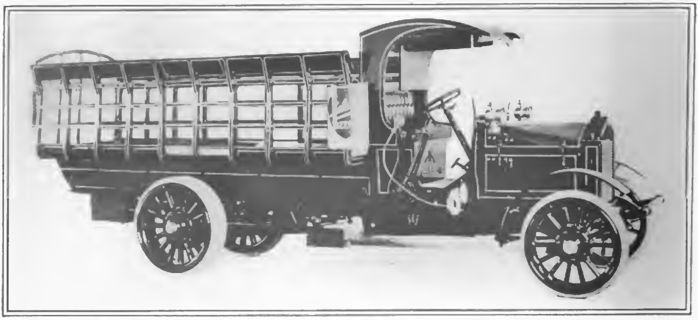
The steel body presents the following advantages as compared with wood or other material: It is of lighter weight for equal size or capacity; it is stronger; it is more durable; it requires less attention during life; it can be built for less money; it can be maintained more cheaply: costing less and lasting longer, the annual depreciation charge is less, reducing the cost of operating the truck; being of lighter weight, one of two alternatives is offered, (a) tire wear is lessened for equal load or (b) heavier loads may be carried to compensate for the saving in body weight; it may be cleaned more readily and presents a more sanitary and more cleanly appearance; in the case of ambulances and the like, the feature of complete and thorough fumigation in a short time is very valuable; it is impervious to weather and climatic conditions, and has numerous other minor advantages.

One reason why the truck manufacturer has not found out these things and taken advantage of them lies in the general attitude toward bodies and body work. The average maker feels that his work is essentially mechanical, dealing with metals and mechanisms mostly. He knows little and cares less about wood work, looking upon it as a necessary evil. If possible he would like to sell chassis only, allowing carriage workers and wagon builders to make the bodies to suit customers, after delivery of the truck. With this idea in mind, he begrudges the space given over to the storage of lumber, to the body shops, painting and other parts of the body work.

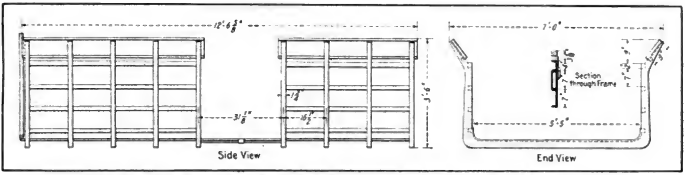
This situation has been brought about partly by the insistence of buyers for something different. Grocers for instance, who have bought stock wood bodies for years, when they buy the first motor truck want something entirely different from all of their wagon bodies as well as all those the motor truck builder has turned out previously. This necessitates making each body special, running into an enormous amount of factory space, as well as causing much delay and costing the buyer more money.

Slowly, the best firms are forcing the standard body forms upon their customers, knowing full well that the little changes insisted upon are immaterial, and often inspired by a lack of information, while the standard form which is offered will do the work just as well with a minimum of delay and expense.

It is possible that the separate sale of bodies and chassis may be the ultimate outcome, but regardless of that, the present article concerns itself with the materials used. Wood to make a good body material must be well seasoned, necessitating purchase long before it is wanted and continuous storage over a long space of time and in a place which is kept protected from weather and climatic changes. Even



Side View of the Pierce-Hale & Kilburn All-Steel, One-Piece Brewery Body, Bringing Out Its Pleasing Lines and Very Apparent Utility



Drawing of the Pierce-Kilburn All-Steel Body, Giving the Details of Its Construction and All Principal Dimensions

after long seasoning, it can not be certified to as entirely free from any possibility of shrinkage. It is easy to work, but that very fact requires considerable care in working it. It is more difficult to get in large sizes and selected quality, because the quantity is diminishing steadily. Even when well built, of the best material, and with the finest of workmanship, it must be braced strongly with steel straps where the stresses come and steel wearing plates where wear will come. If steel makes it stronger and better able to resist wear, the question arises, why not use steel altogether?

Metal Necessitates Better Shop Equipment

Leaving aside for the present, the matter of steel upon a wood framework, it will be shown that the all-steel body has all of the advantages previously claimed for it. One trouble that the use of this appears to bring about lies in the difficulty of fabricating it, which has led those body builders not properly equipped to handle it to say that it is not suitable. These say it is difficult to paint, as this will not adhere to the metal, that a lack of proper paint causes it to deteriorate rapidly, so that it has a very short life, etc.

Upon investigation, this, too, is found to be due to a lack of equipment, the best firms having no trouble along these lines. The paint may be baked on to form a hard enamel or it may be applied in the ordinary manner with the best results if care be employed. A Brooklyn body builder has all-steel bodies which have been in constant service of coal dealers in New York City for more than 14 years. As is well known, nearly all coal is sent out wet, consequently these bodies have been subjected to the action of water in warm weather and ice in cold. They are retouched or revarnished once a year, but no oftener. To-day they look as well and appear as serviceable and as strong as when built.

These bodies are of the flat sheet type, held together by means of plates and angles, rivets being used. This is the heaviest form of steel body which can be built, yet these bodies average 25 pounds to the ton capacity lighter in weight than wood, the 7-ton size weighing but 3,400 pounds. A well-ironed brick dumping body in oak will weigh from 2,300 pounds upward according to the size, character of the work and other things. This same body can be built in steel to weigh from 2,100 up.

Pressed Steel Fits in Much Better

The better form of steel body construction, however, is distinctly different from this. It includes the use of pressed steel for all but the sheet steel forms, all corner pieces, braces and stiffeners, etc., being of this material. As is well known, this material is lighter, cheaper and stronger than structural shapes, whether of the angle, channel, Z, T plate or bar form.

This material may be united with the sheets by autogenous or other welding processes as in the case of the Hale & Kilburn work, by rivets as in the Monahan bodies, by spot welding, by bolts or otherwise. Obviously the first named makes the most solid, permanent and all-around best job. It unites the whole into a single unit, which is stiffer, stronger, more permanent and lighter than any other combination. Moreover, if both the pressing and welding be done upon a huge scale, the total cost of a body is not alone less than by any other method, but it is also much less than a wood body can be built for.

This considerable money saving may be used in one of two ways: it may be taken by the truck maker as an increase of his profits or the price of the truck may be reduced by that amount, making it just that much easier and quicker to sell.

A Special Brewery Body Is Noteworthy

The pictures and drawings herewith show a special body constructed along these lines by this firm (Hale & Kilburn), which proves all these points immediately. This is an all-steel, one-piece brewery body, ordered by the Pierce-Arrow company, by them exhibited at the Chicago and Boston shows, and later delivered to the Germania Brewery of Buffalo. One picture shows the empty body and the other the complete truck with a load, in its working clothes so to speak.

Some idea of the saving it is expected to effect in the simple matter of repairs may be gained from the statement that the larger New York breweries have wood shops with an area of half that of the body department of an enormous motor truck factory like the Packard, for instance, described elsewhere in this issue.

This large amount of repair work is due to the cutting of the wood making up the floor, stakes and other parts of the body by the iron chimes of the beer barrels. These get wet, rust and oxidize away to a very thin edge, which cuts just as a knife would. The result is that the bodies need constant repairing. Another item is the fact that the barrels frequently are loaded on the wagon while wet all over. Moreover, the working part of brewery wagons is seldom covered, hence it is exposed to sun, rain and weather conditions indiscriminately. All these have a marked influence upon its life.

Pressed Steel Even for Floors

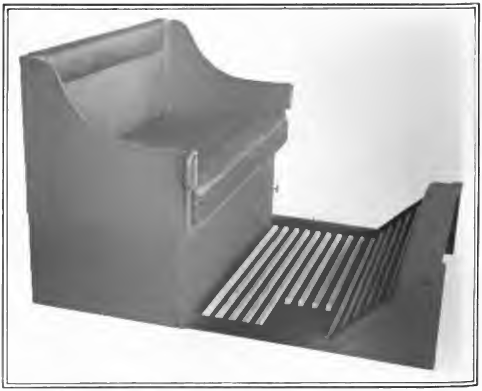
In the Pierce body, which as stated was made by Hale & Kilburn in the Philadelphia shops and a drawing of which is shown herewith, the entire construction is of pressed steel except the floor. This is a corrugated material, but doubtless the corrugations were put in by pressing. The nine sills, if they may be called that, are of pressed steel, the hollow section varying from a shallow rectangle about 1 by 1.75 inches to a deep rectangle 3.25 by 1.75 inches. These are united along the top by what looks like a board but really is pressed steel of a hollow section, 9 by 1 inch. Along its under side, this carries a stiffening rib of rectangular section.

The sills are united along the sides by hollow rectangular bars of pressed steel, four in number, the upper one 1.75 square, the others 1.5 by 1.75 inches, welded at each end to a post. The lowest of these has a curved inner face to which the flooring is fixed, the latter also being curved at the inside corners. A steel gate of somewhat similar construction fills the side opening, this being removable, while the tail gate is also the same and hinged at the bottom. For side or rear loading or unloading, a set of hollow pressed steel skids is

The Steel Brewery Body in the Service of Buffalo Brewery, Showing How Poorly Piled Barrels Would Cut Wood

provided, these being of less than half the weight of well-iron oak or ash skids of equal size and capacity.

The truck cab shown below presents an interesting application of the steel body form to modern truck use. This is the complete cab, framework, flat sides, floors, etc., the whole thing and all of it is made from steel, except the upholstering and the small, narrow, wood strips which are inserted in the steel shapes to form a foundation for the upholstering. Aside from the opening in the front of the seat base with its door which may be opened, and which as a consequence, must be in a separate piece, hinged on, and the floor slats which are of wood, this completed cab forms a single piece. It is indestructible as to fire, water, or other actions; it is stronger than wood, yet lighter in weight; painting in the original factory, where the same is baked on and thus assumes the form of a hard enamel, is the only work needed to be done upon it. Generally speaking, this should be cooler than wood in summer for the driver to be in close contact with, for although metal holds the heat more than wood, this is so thin and has so little body, that is, there is so little to it, that the heat would be dissipated faster than with wood or any other metal which from its nature had to be used in thicker sheets than this pressed steel. All of the panels are pressed out in a single sheet, being united afterwards. This job done for the Alco company by Hale & Kilburn is susceptible to a great variety of changes with little or no extra expense. The seat could be higher or lower, wider or shorter, the footboard could be wider or shorter or have more of an incline or less, and in many other ways, this design could be changed to suit the manufacturers' needs.



The All-Steel, One-Place Cab Used on All Alco Cabs and Made by Hale & Kilburn in the Philadelphia Shops

Any one could compare the relative weights of steel sheets and wood for body construction in this manner: The steel used ordinarily for that type of body is approximately 10 or 12 gauge, weighing from 7 to 8 pounds a square foot. The wood used for panels, that is white oak 1 inch thick weighs 3.75 pounds a square foot. But the former is almost self-sufficient while the latter is of no use whatever unless placed on a framework of oak not less than 1.75 inches square in section and strongly ironed with inside and outside braces from .5 to 1 inch in section up to .75 by 2 inches. On the average body, an inside and an outside brace will be required every 20 inches of length. Besides this, the floor will have to have wearing strips of iron or steel about 2 inches wide and .125 inches thick.

A further item in the weight of the wood truck body is the sill. Varying with the size, shape and character of the body, from two to six of these must be used, the former on all lighter bodies, the latter on the heaviest ones subjected to the greatest wear. These vary from 2 by 5 up to 4 by 7 inches.

FIRE COMPANY DESIGNS OWN ENGINE

Philadelphia, May 13—An automobile fire engine designed by the members of the Union Fire Association, of Lower Merion, Pa., has been recently put into service by the company after having been built under the association's own engineers. The association, whose fire house is in Cynwyd and whose membership is made up of residents of Cynwyd, Bala and Merion, has tested the apparatus in service and found that it is capable of supplying two good streams.

Legislative and Legal Matters of Interest

Truck Owners' Liability for the Acts of Drivers and the Management of Vehicles—The Law of Negligence and of the Road—Skidding—Equipment

By X. P. Huddy, LL. B.

PRACTICALLY no complaint on the part of the public against the manner in which motor trucks have been operated on city streets and other public highways has been experienced. All of the criticism heretofore has been directed against the pleasure car and now we are hearing even less about the over-speeding of these vehicles and speed traps. Prejudice against motor vehicles no longer exists.

But accidents and collisions will continue to occur. They cannot entirely be eliminated, no matter how perfect the car may be constructed and equipped, and no matter how skilfully trained the driver may be. Wherever there is moving machinery and many machines moving contact is apt to produce injury, notwithstanding all possible safeguards have been provided. It is marvelous that there are not more collisions resulting from the congested traffic on the busy streets of a municipality such as New York City. Even railroads are not able to prevent accidents and they run their vehicles on fixed rails.

What about the motor truck and what are the liabilities and responsibilities of its owner for accidents and collisions? We will consider briefly the legal duties of those who employ motor propelled vehicles to do their hauling.

The Law of Negligence

The operation of these vehicles is controlled generally by what is termed "the law of negligence" and this law is the embodiment of many rules and regulations of conduct to be followed by those employed as motor truck drivers. The "law of the road" is also included in the law of negligence and must be carefully complied with by truck drivers.

The legal status of the truck owner in reference to these laws we will now consider.

The propulsion of an extremely heavy weight through the streets of a city or over country roads where there is a considerable amount of traffic requires a certain high degree of skill on the part of the driver, if property and personal safety are to be preserved. This load of freight, too, is valuable, possibly worth from $10,000 to $15,000, covering the truck and the goods carried. Therefore such a valuable piece of movable property is not to be entrusted to any kind of a driver. So the first thing to do, after selecting a good motor truck, if not done in advance, is for the owner to employ a suitable and careful operator.

Selection of Drivers

The law requires an employer to engage competent servants or employees and reasonable care must be exercised by the employer to see to it that the person he engages is reasonably fit to perform the required services, otherwise the employer will be liable in damages for injuries committed by the servant while engaged about his master's business. The foregoing rule applies to the choice of drivers for motor trucks. And if it be ascertained that a driver who has been employed is not competent or is careless, he should be discharged. To retain him is to invite legal liability for damages to property or for personal injuries. But the employer need only exercise reasonable care in selecting a driver.

Having selected a competent driver, or exercised reasonable care in so doing, what next are the duties of the truck owner? The employer himself has very little to say about the operation of the truck. Its management is in the hands of his employee. Still, if the employee commits injury while driving the truck, negligently, the law says that the owner shall be liable in damages, as the act of the agent is considered the act of the principal. But if the party injured was in the least negligent which contributed to his injuries then no liability exists.

The liability of the employer, however, is confined to such acts as the employee commits in the course of his employment while engaged in driving the truck for his employer. If the driver uses the truck for his own personal benefit, then the owner is not liable if injury is committed. Again if the driver commits an assault upon another, the employer is not liable, for the reason that the driver is not engaged to commit crimes. There is, of course, no liability for a pure accident, where no one is to blame for that which happened.

The Law of the Road

Motor trucks have the same right to use the public streets and roads as other vehicles, but it is competent for the law to exclude them from certain avenues of travel on account of their size and the burden they carry. For example, commercial motor trucks carrying freight may not be permitted to run through parks and residential streets, where there are other highways which can be used.

Should a motor truck driver fail to apply the rules of the road and a collision should occur, presumably he would be considered negligent and the employer would be liable, unless it be shown that notwithstanding the driver's failure to comply with the law, the party injured could have prevented the accident by the exercise of reasonable care.

Skidding

In the operation of heavy motor trucks great care should be exercised by drivers to prevent skidding and thereby colliding with other vehicles or persons on the highway. But in order to hold the owner of a truck liable in damages for its skidding and committing injury, it must be proved either that the chauffeur was negligent in the operation of the machine, or that he did some act which a prudent person would not have done, or omitted some act which a prudent person would have done in the operation of the vehicle, or in some other respect was negligent.

Every driver knows that his truck is apt to skid on wet and slippery streets and he should operate his motor truck accordingly, but it is not negligence to apply the brakes while traveling at an excessive speed in order to reduce the speed, even though skidding occurs from the application of the brakes, owing to the slippery condition of the pavement, if there be nothing to show that the driver did not do all that he could have done to avoid the accident.

See Philpot vs. Fifth Ave. Coach Co., 142 N. Y. App. Div. 811; Parker vs. London General Omnibus Co. (K. B. Div.), 100 Law T. R. (N. S.) 409.

See Walton & Co., vs. The Vanguard Motorbus Co., T. L. Rep., vol. XXV. No. 2, p. 13, Oct. 27, 1908.

The mere fact, however, that a motor truck skidded and damaged a street lamp is sufficient to allow the case to go to the jury on the question of the driver's negligence.

The Editor's Viewpoint

Increasing Use of Metals

TO-DAY, in the motor truck industry, there is noticeable a tendency to appreciate and try to break away from, the use of horse methods. Merchants unable to gain the economy or efficiency counted upon in buying trucks have sought a reason and found it in the slavish following of methods and systems devised for horse speed and ability, but unconsciously passed along to the commercial vehicle. Agents unable to dispose of their trucks as quickly or as easily as should have been the case, knowing their economy and efficiency, have found the reason in the merchants' knowledge that their horse systems would not avail with the quicker method of transportation and hesitated to make the change for the large financial consideration involved.

Similarly, manufacturers, engineers, designers, workmen and all others engaged in the commercial car industry have found here and there, everywhere, these evidences of horse methods and horse speed to which the truck is forced to comply.

One single item in which this is just becoming known is in the materials of construction, for bodies, cabs and other parts of the cars. It is being found that horse wagons cannot be used for the modified service even as trailers, for they were built to a maximum rate of travel over the pavements and roads of 6 miles an hour. When this is doubled or multiplied by 2.5, the shocks from road obstructions, due to speed alone, are quadrupled or multiplied by 6.25 or more. Horse-drawn wagons were not constructed for this and will not stand it.

For this reason and others it was found necessary to double, triple and quadruple the sections of wood used for motor truck bodies, with the result that an enormous total weight was reached. This, in turn, is destructive to the mechanical parts of the chassis, so much so that the manufacturers have agreed upon a definite maximum for the various loads, ranging from 500 pounds for the smallest wagon to 2400 pounds for the biggest trucks.

To lower these figures, and there is no question of the desirability and profit from so doing, it becomes necessary to have another material. In this quandary practically all makers have turned to a form of metal. This is being used to the exclusion of almost everything else, elsewhere on the car, why not for the body? Body builders assert, even those not favorable to metal bodies, that from 10 to 20 per cent. of the body weight (this approximating 5 to 10 per cent. of the total) can be saved by substituting metal.

Moreover, they assert that superior strength, greater durability, less first cost, lowered upkeep cost, and many other equally desirable qualities will be gained at the same time. These points are proven in the first of a series of articles on this subject to be found elsewhere in this issue. The attention of manufacturers is directed to this article specifically because the most prominent worker in this line, with the best shop facilities for producing this class of work, and the desire to get into it, having already produced numerous different samples of work to prove all these points, places himself on record as "not doing anything in this line, because there are not enough quantity orders in sight to warrant taking it up wholeheartedly." This firm recently has accepted two orders, one for 7000 pleasure car bodies and the other for 2500 taxicab bodies, both in steel. Neither one influenced the shop routine in the slightest degree, giving a fair idea of the capacity.

Yet, while this maker can save every manufacturer 20 per cent. or more in body cost, together with giving all of the other highly desirable qualities, not a maker is in a position to order more than one or two bodies at a time. Manufacturers should begin to put the body forms catalogued and their ideas on this subject in such shape as to enable them to take advantage of this situation.

Sales Methods and Possibilities

SOME one has said with aptness "In time of peace prepare for war." At a time of the year, like the present, where there is something of a lull in sales, between the rush and excitement of a continuous round of shows, and the real selling period of midsummer, when the continual dropping of valuable horses from exhaustion induces quick action, salesmen should be on the lookout for methods or means of increasing the amount of business done.

There are many ways in which this can be done; for instance, now is a good time to talk co-operative buying. By this is meant several small firms, closely allied and possibly located somewhat close together, no one of which could afford a car individually, but each one of whom could use, and, in fact, would like to use a car for a portion of the day. If these lines of business are such as not to require delivery at identical times of the day, a car or two for the group will go far toward simplifying and cheapening the delivery.

Again, there is the matter of soliciting rentals. By this is meant the use of a machine by the hour, day, week or other period, the same being applied for by telephone for short periods or contracted for on long terms. There is an enormous amount of business to be done in this line both in a small way and on a very extensive scale. Moreover, from either viewpoint, there is money in it.

Another thought is the urging of sales in intermittent work, such as coal, ice, brewing, hay and feed, and other seasonable products with which the demand is heavy at times and very light at others. Here the argument is developed gradually but certainly that the horse costs as much idle as working, while aside from the fixed charges on trucks of less than one-third of the total, there is no expense and no worry or trouble.

Late News of the Month

Newark Holds a Truck Parade With Many Features—Goodrich Company Absorbs Diamond Rubber—Other Tire Company Activities—Progress of Massachusetts Highway Restriction Bill—Other News Items

NEWARK, N. J., May 26—Not to be outdone by New York City, the commercial vehicle interests of this city held the first annual motor truck parade yesterday and it was such a success that all are talking of repeating it next year on a larger scale. Due to the energetic work of the various dealers and agents, 165 vehicles of all sizes and representing 49 different makes were in lines, and aided by favorable weather, which New York did not have, did much to convince Newark merchants of the practicability and utility of motor trucks.

The parade covered a distance of 12 miles through the business portion of the city, including all of the principal streets, which it passed through at approximately 2 in the afternoon. It ended at Olympic Park, Irvington, where for the balance of the day all of the vehicles were on view. Although admission to this was by ticket, all business men and the agents and dealers were supplied with these, which they distributed freely. The idea was to keep out the rabble and the curious, not to make money. This last feature was considered of great importance and was voted fully as much a success as the parade itself.

More than half a million dollars worth of cars were in line, the sizes varying from the tricar and motorcycle delivery of 300 pounds to a pair of huge lumber trucks with trailers capable of hauling 15 tons, in fact doing just that daily. The electric was well represented in this the home of the Lansden company, known as a pioneer in the electric field, and also of the Edison Storage Battery company. More than half of the cars were entered by private owners, the dealers making up the balance. This is very creditable, considering that it was expected the latter would have to furnish from two-thirds to three-fourths of the cars in order to make a showing, and indicates that the present owners of commercial vehicles are alive to their opportunities.

In point of numbers, the Autocar had the largest representation with 41 cars in line, many of these from New York department stores but the majority operated in Newark and vicinity. White was next with 15, then came Mack with 9; General Vehicle with 7 and Lansden with 6. The others will be found in the accompanying list of makes and numbers of each.

Abell	1
Adams	1
Alden-Sampson	3
Atterbury	1
Autocar	41
Baker Electric	2
Cadillac	1
Cartercar	1
Chalmers	2
Chase	3
Commercial	1
Commer	4
Dayton	1
Detroit Electric	1
Flanders	2
Ford	1
Garford	5
General Vehicle	7
G. M. C.	1
Grabowsky	2
Gramm	1
Hewitt	1
Hupp-Yeats Electric	1
KisselKar	2
Koehler	1
La France	1
Lansden Electric	6
Lauth-Juergens	1
Lippard-Stewart	2
Little Giant	3
McIntyre	1
Mack	9
Mais	5
Mercury	3
Minneapolis	1
Modern	3
Newark	1
Packard	5
Peerless	3
Pierce-Arrow	5
Pope-Hartford	4
Reo	1
Saurer	3
Simplex	1
Sternberg	1
Studebaker Electric	1
White	15

CONSOLIDATION OF SOLID TIRE MAKERS

AKRON, O., May 21—The merger of the B. F. Goodrich Company and the Diamond Rubber Company by the sale of the latter to the former will take place shortly, the stockholders of the latter having approved of the transfer. This deal will give to Akron the largest rubber company and the biggest tire factory in the world.

The plan of consolidation, for that is what it amounts to, includes the payment of $45,000,000 for the Diamond company on the basis of each holder of a share of Diamond stock receiving 2.7 shares of Goodrich common stock, one share of preferred and $55 in cash. To effect this transfer, the capital stock of the Goodrich company has been increased to $90,000,000, divided into $30,000,000 preferred stock and $60,000,000 common. The Diamond company now employs 4,000 men and the Goodrich company 5,000, the monthly payroll of the former being $300,000 and of the latter $400,000. Both trademarked names will be maintained, and it is understood that no changes in agencies will be made.

Some of the Vehicles Seen in the Big Newark Truck Parade: At Left, 15-Ton Lumber Truck with Its Huge Load; at Right, Smaller Florist's Car with Small Greenhouse as a Body

The officers of the new Goodrich company are: F. A. Hardy, Chicago, chairman of the board of directors; F. H. Mason, Akron, vice-chairman; B. G. Works, president; A. H. Marks, vice-president and general manager; E. C. Shaw, vice-president and works manager; H. E. Raymond, vice-president and sales manager; W. B. Miller, vice-president and assistant sales manager; W. A. Means, treasurer. These officers, with O. C. Barber and C. C. Goodrich, will constitute the board of directors.

PROGRESS OF HIGHWAY RESTRICTION BILL

Boston, May 17—After weeks of backing and filling the Legislature practically came to the conclusion today that no important motor vehicle legislation will be possible this session. This decision was signallized by the report of the Committee on Roads and Bridges to the Senate of an order requesting the appointment of a recess committee of two Senators and five Representatives to consider the automobile bills during the summer and report not later than the fifteenth of next January. This the Legislature would not authorize.

The fees bill, drafted in response to a request of the Governor, proposed to change the registration plan for commercial motor vehicles from a flat rate of $5 a year to a sliding scale rate based on horsepower, with a minimum fee of $5 for 10 horsepower, or less vehicles and 50 cents a horsepower for vehicles above 10 horsepower. This plan was opposed by the motor trucking interests, assisted by the pleasure car men. The bill was twice drafted by the committee, the first time being recommitted before it was actually reported and the second time being sent back to the committee after a report. Since then it is laid in the committee docket, being considered from time to time, until at last the committee decided to ask for a recess committee.

The highway restriction bill, which proposed to limit the weight and speed of commercial motor and other vehicles, and contained other requirements which the trucking interests considered unfair and likely to put the motor truckmen out of business, has had a far from placid career. When the Highway commission suggested it, there was a weight limit of 6 tons including vehicle and load and a speed limit of 8 miles an hour for heavy vehicles, also a requirement that heavy trucks must secure permits from local authorities to use the roads and that their owners must be responsible for road damage. This was opposed by truck owners and dealers, and there were conferences at which the weight and speed limits were shifted back and forth. The bill was finally reported out of committee but immediately ran up against so many amendments that it was sent back to the committee again, and it has been there until today. As the recess committee was not authorized, there may be some action upon the highway restriction bill at this session.

WILMINGTON HAS TRAFFIC REGULATION

Wilmington, Del., May 10—Street traffic in Wilmington is now systematically regulated by law and the police for the first time in the history of the city, new traffic regulations having gone into effect this month, with a traffic squad in the business district to enforce them. Briefly, the new regulations are as follows:

Keep to the right.
Pass overtaken vehicles on the left.
Turn into a street to the right around the right-hand curb.
Turn into a street on the left around center of intersection.
Do not stop on left side of street.
Do not back in turning into another street. Go around the block.
Give warning before slowing, stopping, backing, starting or turning.
North and south-bound traffic has right of way over east and west-bound traffic.
Stop all vehicles on approach of fire apparatus.
Do not pass on right side of street if street car is loading or unloading.
Use reed horns for general purposes.

POLICE WHISTLES.

One—North and south traffic stop. East and west proceed.
Two—East and west traffic stop. North and south proceed.
Three—Danger. Stop all vehicles.
Ignorance of the law is no excuse for violation

While the requirements embody the principles of some general laws that were in force, the schedule is entirely new and until the latter became effective the police had no systematic plan of enforcing the law. Drivers are rapidly adapting themselves to the new conditions with excellent results.

PLEA FOR CHEAPER PASSENGER CARS

New York City, May 22—At the monthly meeting of the Electric Vehicle Association of America, held in the Engineering Societies building last night, George H. Jones, power engineer of the Chicago Edison company and R. Macrae of the same company, presented a paper on "The Electric Passenger Vehicle" to a large audience.

In this Mr. Jones laid great stress upon the rapid development in the line of electric commercial vehicles and also in the way of passenger carrying cars or buses. In suggesting the exploitation of the latter field, the author took occasion to suggest that a lower priced car, although well and comfortably constructed, would sell much better and give better all around service than most of the present vehicles, which he ridieuled as plush lined show cases. His idea was a plain service machine, built to sell at or near $1,000 and capable of a maximum speed of 25 miles an hour. He also made considerable capital of the lack of instructions given the ordinary driver of electric cars, and pointed out the work of his company in this respect as a model.

BIG TRUCK PARADE FOR LONDON

London, May 15—A big commercial vehicle parade is being planned by the Commercial Motor Users' Association of London for Monday, May 27. Apart from the fact that the parade is promoted as a big advertisement for the C. M. U. A.'s official organ the gathering should undoubtedly prove an interesting one, as 308 machines have been entered, the largest fleet being one of a haulage contractor.

With regard to the prizes there are three championship awards for answers received in a written examination held beforehand, for which there has been 90 entries. Twenty entries have been received in the competition for awards to engineers whose groups of vehicles are considered in the best all round condition considering the mileage and work they may have encountered. A very large number of drivers will receive prizes and the much-advertized cup offered by *The Commercial Motor* is to be competed for by 22 teams of six vehicles apiece.

U. S. RUBBER INCREASES CAPITAL

New York City, May 22—At about the same time as the details of the Goodrich-Diamond merger were announced, President Samuel P. Colt, of the United States Rubber Company, controlling the Rubber Goods Manufacturing Company, which in turn controls the United States Tire Company, announced that the company had found it desirable to increase its cash capital by $10,000,000 to finance manufacturing extensions and increase production. The plans call for an increase in the total authorized capital stock from $75,000,000 to $120,000,000, the latter being divided into $40,000,000 common and $80,000,000 preferred.

NATIONAL SALES CONVENTION PLANNED

New York City, May 10—Officials of the Automobile Board of Trade are working upon the plans for the convention of sales managers, planned to be held here some time in June or July. The idea is to hold the convention when it is most convenient for all concerned.

The program will include the preparation and reading of papers bearing upon subjects peculiar to the sales department of the automobile manufacturer, and will be beneficial not only to manufacturer but to the dealer and owner.

The members of the trade committee, which has the matter in charge, are: H. O. Smith, Premier Motor Mfg. Co., Indianapolis, Ind.; E. R. Benson, Cadillac Motor Car Co., Detroit, Mich.; Wm. E. Metzger, Metzger Motor Car Co., Detroit, Mich.; C. W. Churchill, Winton Motor Carriage Co., Cleveland, Ohio; W. T. White, The White Company, Cleveland, Ohio.

ADAMS EXPRESS TO ELIMINATE HORSES

Philadelphia, May 11—After a period of experimentation extending over 2 years in the service of the Adams Express Company, the adaptability, economy, efficiency and time-saving qualities of the motor truck in collecting and delivering packages have been so forcibly demonstrated that a plan of gradual elimination of horse-drawn equipment in favor of the truck is now under way. Looking to this end a permit has been issued by the Bureau of Building Inspection for converting the company's stables on 22nd street, below Market, into a garage. Armstrong & Latta, contractors, will do the work, which will cost in the neighborhood of $27,000.

The supplanting of horses and wagons will be done by easy stages, and upon the completion of alterations the large fleet of trucks now in daily service of the company and housed in various sections of the city will be kept in the garage.

TRUCKS ONLY FOR JOHNSON COMPANY

Milwaukee, Wis., May 24—The Johnson Service Company of Milwaukee, which has been building pleasure and commercial cars, has decided to devote its entire attention in the car building field to commercial vehicles. H. W. Ellis, who has been in charge of the Johnson company's Chicago branch for some years, has been elected president to succeed the late Prof. Warren S. Johnson, founder and president of the concern. Paul F. Johnson and Carl Johnson, sons of the founder, were elected vice-president and secretary-treasurer, respectively. Monthly dinners have been inaugurated by the new administration to bring together the executive officers, superintendents, foremen and others for welfare councils.

PITTSBURGH FAVORS MANUFACTURERS

Pittsburgh, May 23.—Assemblers of automobiles failed to get the contracts for six motor-propelled combination chemical engines and hose wagons purchased recently by the city, although their bids were lower than those who received the contracts, the Knox company and the La France company. These concerns will furnish the machines at $5,250 each. The bidders who failed to get the contracts had prices of $4,500. Mayor W. A. Magee and Director H. B. Oursler, of the Department of Supplies, said that the lowest bidders were not manufacturers, but assemblers. In the future, it was stated, they might not be able to supply a repair part, and were classed as "unreliable bidders."

NEW LAW IN ONTARIO PROVINCE

Toronto, May 16.—Commercial vehicle and automobile owners in the province of Ontario will be interested in some of the provisions of the bill which was recently given a third reading in the Legislature. Some of these are: No motor vehicle shall carry a searchlight; no motor vehicle shall be driven at a greater speed than 15 mph in a city, town or village or 20 mph outside of cities; notwithstanding the previous fixed speeds, no person shall drive a motor vehicle recklessly or negligently or at a speed or in a manner dangerous to the public; when damage is sustained, the onus of proof shall be upon the owner or driver; if the employer be present in the vehicle, he shall be liable for conviction as well as the driver for an offense.

MAGNETO COMPANY BROADENS OUT

New York City, May 20.—It became known recently that a new firm, the Splitdorf Electrical Company, had been incorporated under the laws of New Jersey to take over the plants and business of Charles F. Splitdorf, well known maker of ignition apparatus, much of which is in use on motor trucks. The leading spirit in the new concern, which is capitalized at $3,500,000, is John T. Alvord, of Torrington, Conn. He has been elected president, while Mr. Splitdorf will remain as vice-president. The other officers are: Bryant S. Keefer, treasurer; Carlos W. Curtiss, secretary and general manager, and the directors, Messrs. Alvord, Splitdorf, Keefer, Curtiss and John R. Wiles.

SMITH COMPANY OPENS SALES OFFICE

Chicago, May 25—The A. O. Smith Company has established general sales offices for the sale of the new Smith worm drive truck at 2328 Michigan avenue, this city. The truck department is in charge of C. W. Babcock, formerly of the Kelly-Springfield organization, who will continue at Chicago as general sales manager.

The Smith company has established but few agencies as yet, confined to dealers in this territory and in Minnesota. Twelve machines have been sold so far; a good record for the first model was exhibited at the show in February.

ONLY ONE NEW YORK SHOW IN 1913

New York City, May 20.—By the definite decision of the Automobile Board of Trade, made known through its lease of Madison Square Garden for an automobile show, it became known that next year will see but one display in the Metropolis. That one, however, will be divided into two sections, one at the Garden, the other at the new Palace. The exhibition will be handled by the Show Committee, composed of Col. George Pope, chairman; Charles Clifton, Alfred Reeves and Merle L. Downs.

NEW ENGINEER'S HEADQUARTERS

New York City, May 15.—Shortly after May 1 the Society of Automobile Engineers moved its headquarters to the new United States Rubber Company building, corner of Broadway and 59th street, from the quarters at Broadway and 41st street, which have been occupied for so long. The new building is not alone more modern, but considerable additional space is gained, the present plans including a member's room and library besides the offices and business rooms. The new offices are on the 12th floor.

CHARLES ABRESCH, A PIONEER, DEAD

Milwaukee, May 23—Charles Abresch, founder and head of the Charles Abresch Company, and the Abresch-Cramer Auto Truck Company, a subsidiary, died at Milwaukee recently after an illness of 6 months. He was 62 years old. He was a wagon maker by trade and built up an immense business in the production of automobile bodies, parts, and more recently complete commercial vehicles in various sizes.

DECISION IN NOBBY TREAD TIRE SUIT

New York City, May 18.—An important legal decision of the week was that of Judge Noyes, of the United States Court of Appeals, in the so called Nobby tread suit. Judge Noyes reversed the decision of the lower court and rendered his decision without recourse.

Commercial Car Questions Discussed

Analysis of Usual Breakages

Editor Commercial Vehicle:—
(30).—What are the most common breakages on motor trucks? This is to settle an argument, several of us disagreeing as to the things which "go" first in this severe service. A. F. DOHN.
Jersey City.

Few figures are available to permit of answering this question exactly as applied to commercial car work, but the instance of some 300 breakages which came to the attention of one repair shop may be cited as parallel, although few of these were on motor trucks.

In this list, which does not include the result of collisions nor of ordinary wear, broken aluminum castings headed the list, consisting of more than 34 per cent. of the total. Broken cast iron parts came next, but constituted only nine per cent. As a guide in this particular discussion, the entire list is given below.

ANALYSIS OF BREAKAGES ON 300 CARS.

Material and Part.	Number.	Per Cent.
Broken aluminum castings	104	34.66
Broken cast iron castings	27	9.00
Broken universal joints and pins	22	7.33
Broken connecting rod bolts	17	5.66
Broken springs	16	5.33
Broken differential gears	14	4.66
Broken bevel pinions	13	4.33
Broken crankshafts	12	4.00
Broken wood wheels	11	3.67
Broken large bevel gears	10	3.33
Broken connecting rods	9	3.00
Broken hubs	9	3.00
Broken valves	8	2.66
Broken pressed steel frames	8	2.66
Broken tubular rear axle housing	7	2.33
Broken tubular frames	6	2.00
Broken steering gear housings	6	2.00
Broken tubular front axles	5	1.66
Broken forged front axles	3	1.00
Broken brake drums	3	1.00
Broken steering joints and connections	2	.66
Broken armored wood frames	1	.33
	300	99.97

As there is little aluminum used on American motor trucks it may be considered that the importance of the first item will decrease and that the others will increase relatively. Makers say so much about overloading, which should affect the rear construction most of all, that in a strictly commercial car list of breakages one would expect to find rear axles, rear springs, driving chains, brake parts, hubs, wheels and other rear construction parts more prominent than in the above table.

Care of Edison Batteries

Editor Commercial Vehicle:—
(31).—In the May issue, on pages 44 and 45, reference is made to the Edison storage battery. There are several ideas which we wish to add to what is stated there, as follows—

1. The electric filler is for distilled water only.
2. Adding the potash to the battery solution is not necessary until the 250th cycle, when the old solution should be emptied and new put in.
3. The solution should be kept at a definite height above the plates.
4. There seldom are any low cells.
5. The battery compartment must be kept dry and clean, otherwise the cans, being of metal, will be corroded by electrolytic action.

Orange, N. J. EDISON STORAGE BATTERY COMPANY.

Adding Electric Motor to Gas Truck

Editor Commercial Vehicle:—
(32).—Would it be reasonable to add a winch driven by an electric motor to a truck which is driven by gasoline? Also what would the whole outfit weigh and about what would it cost? The five-ton truck which we own would be much more useful in our business if it included some form of a winch for hoisting heavy objects. We have been advised by the makers that it would be necessary to send it back to the factory for about a month in order to apply one driven from the engine, while it would cost more than we care to spend. The cost is not the only item, the loss of the vehicle for such a long time being more serious, as we have but one truck. LE MAR COMPANY.
Chicago.

Your best plan would be to send it back to the factory, as the makers have suggested, renting another vehicle while the work is being done. The saving which the winch would give you in less than 6 months would offset the cost of the change as well as the rental of the second truck. It is possible that the manufacturer would meet you half way in this rental business, if approached in the proper manner, as the change you contemplate is one which will enable the truck to do better and more satisfactory work. Granting the change made, you would be able to speak more highly of the truck, while your books would show a larger balance in its favor from an economy standpoint.

The change to electricity would require more than just the winch and driving motor, with supports, mechanism for throwing it in and out, and reduction gearing between the two. It would necessitate either a set of batteries or a generator to furnish the power, a drive for the latter, wiring and a controller in either case; if batteries were used charging means would be needed, and with the generator, mechanism for throwing it into and out of connection with the motor transmission shafts, either one would require hanging in the chassis.

Considering the battery (or generator), motor of 2 horsepower, winch, hangings, controller, levers, wiring and all other parts which would have to be added, the total extra weight put on the chassis would be about 1000 pounds. It is believed that the mechanical drive, if the work be done at the factory and with an eye to adding as little weight as possible, can be put on with one-third of this weight. In the average 5-ton truck, weighing approximately 9500 pounds, this would amount to but 3.5 per cent., which would not be noticeable in tire wear or truck upkeep. One controlling lever would be added, in place of two for the electrical method.

An Ingenious Spark Plug Repair

Editor Commercial Vehicle:—
(33).—You might be interested to know of a way in which I brought home my truck recently, the idea being useful to other drivers when similarly situated. The vehicle has double ignition with two sets of spark plugs. One of these blew into pieces and I did not have another with me, and was not near a place where I could get one. As the other plug was in good condition, I did not need this one for ignition, but I did for compression purposes. I took it apart and found that all it needed was something small and round to fit into the interior. A ten-cent piece just happened to fit the opening, after removing the lock nut which holds the porcelain in place, so this was put in and held tightly by means of the lock nut. With this repair, the truck was driven home safely.
Buffalo. J. A. TRASK.

For the benefit of those who have not taken a spark plug apart, the porcelain, which insulates the terminal from the part actually screwed into the cylinder, usually fits down onto a shoulder up to which it is held by means of the binding nut. Invariably the latter has an inner taper against which the porcelain fits also, while the nut projects down almost to the shoulder. With the porcelain out of the way the inner end of the nut could be screwed down tightly against the shoulder. By removing the broken porcelain, the dime just fitted onto the shoulder and the nut was screwed down onto this, thus closing the central hole and preventing any leakage from within.

Locating Knocks Inside the Engine

Editor Commercial Vehicle:—
(34).—Is there any way in which a driver can locate definitely the source of common knocks inside the engine? I have not been driving for very long and am greatly puzzled with a knock in my motor which I cannot locate. It is not like anything they taught me at school, and as I am very anxious to find out what it is and how to remedy it, I am seeking assistance. Is there any device or appliance which I can buy that will help me out in this? GEORGE S. FALL.
Bradford, Pa.

Aside from knowledge and skill which will come with experience and enable the location of trouble like this at once, the amateur can utilize anything which will magnify the sound and thus assist in locating the cause of it. A device of this character is the stethoscope, formerly used by doctors only for listening to heart beats and lung action, but which is now made and sold for automobile and motor truck drivers' use in just such cases as this. The ends are placed in the ears and the receiver moved along the exterior of the engine in close contact with it until by the increase of sound as a given point is approached and the decrease as this point recedes, the trouble is located.

The same result may be arrived at by the use of a telephone receiver, the exterior shell of an old one being removed to reduce its bulk and a central rod affixed to touch the carbon disk at one end and to be used as a feeler at the other. Some repairmen take advantage of the fact that the teeth are extremely sensitive and locate elusive knocks by means of a short section of drill rod. This is held between the teeth, its other end being moved around as described for the stethoscope. All this, of course, is with the engine running. Then as the source of trouble is approached there will be more shock transmitted to the teeth than farther away. It is said the driver becomes extremely exact with this method after a little practice.

Starting Difficulties Overcome

Editor Commercial Vehicle:—
(35).—What do you think causes my engine to start very slowly? I have had this trouble ever since we have owned the truck, and I can not understand it. The ignition system I know to be in the best of condition, for everyone I asked about it said my ignition must be bad, so I have overhauled that from one end to the other several times and feel morally sure that is not the cause.
D. W. DUBOIS.
Baltimore.

Aside from ignition, starting trouble may be due to poor carburetion or mechanical difficulties. Under the former heading some of the following should be looked for: Fuel supply, tank line and piping troubles, including tank nearly empty, tank vent partly stopped so fuel will not flow, valve in fuel pipe partly closed, water in the fuel, carburetor difficulties, as too rich or too poor a mixture.

Under the former head there are a number of mechanical faults or derangements which would prevent starting. Among them may be mentioned the following: Valve spring bent or broken, valve stem bent or gummed in position, weak valve spring, carbon on the seats or other leaky valve trouble, no clearance between valve stem and follower, muffler or exhaust pipe clogged, carbon within the cylinders, piston rings gummed or broken, ring slots in line, cams worn, shifted or broken, piston head or wall cracked, piston rings, piston or cylinder walls badly scored.

Spark Plug Gives Trouble

Editor Commercial Vehicle:—
(36).—I have had trouble with my spark plug for some time, and can not seem to locate the reason. The plug is apparently all right when out of the engine, but when put back in place misses occasionally, gives a late spark at times and causes other trouble. I enclose a sketch of valve and cap.
JOHN TAYLOR.
New Haven, Conn.

The correspondent's sketch of the plug and cap is placed at the left or A of Fig. 1, while the remedy for his trouble is illustrated at B of the same figure. It appears that the plug was set in a pocket, which causes the late ignition, missing and other trouble, carbon collecting there very readily.

By taking the plug to a nearby repair shop all of the metal around this single central hole can be turned out up as far as .0625 to .125 inch above the bottom of the plug. This will leave a large chamber, in the middle of which the plug points project beyond the metal. When this has been done the trouble will cease.

Remedy for a Slipping Clutch

Editor Commercial Vehicle:—
(37).—The clutch in my truck takes hold too quickly. It is of the leather faced friction type. Will you suggest some way to remedy this fault?
C. D. STEPHENS.
Albany.

Put an ounce or two of castor or neat's foot oil on the leather if it is too dry. Spread the oil equally by allowing one part of the clutch to slip over the other. After this has been done fasten the clutch open and let it stand for about 12 hours. If there is too much oil on the leather put some fuller's earth or chalk in the clutch to absorb the oil. Be sure to see that there is no grit in these powders before using them and the clutch should be cleaned with gasoline before the powder is applied. Resin should not be used, as it causes the clutch to grab after the car has been standing and to slip when it is warmed up. A new clutch leather is the best remedy.

Large Proportion of Trucks Carry One Ton

Editor Commercial Vehicle:—
(38).—Kindly advise me how many of the present number of trucks in use, said to be more than 20,000, have a carrying capacity of 1 ton or less?
A. F. FINGULIN.
Cleveland.

There are 30,000 vehicles now in use, according to figures presented in our April issue, and of these 16,250 or 54.2 per cent. are of 1-ton capacity or less.

Taking Care of Gear Breakages

Editor Commercial Vehicle:—
(39).—In trying to shift gears recently while passing through a district where traffic is congested, the gears made a grinding, crashing sound and I felt a shock on the shifting lever. The gears meshed, however, and I completed the deliveries on my route before returning to the garage. There I examined the transmission and found that some pieces had been broken off the teeth of one of the gears. I removed the broken pieces from the gear box, and, as the broken gear gave no trouble, I have gone on operating the truck. But, as I do not wish to get into trouble through negligence, I am writing to ask you if you think it is safe to use the machine with the gear in its present condition. If not, would it be possible to have the gear repaired, or should I get a new one?
JAMES FELTON.
Chicago.

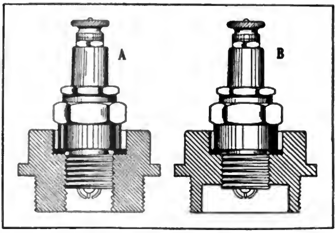


Fig. 1—Section Through Spark Plugs and Valve Cap, Showing Trouble and Method of Remedying It by Turning Out Metal

You did well to remove the broken pieces from the gear box, as, in all probability, they would soon have caught in the gears and caused serious damage. It is not safe to operate the truck with the broken gear, as you cannot depend on the gear remaining in its present condition. It may be cracked, and, if so, is likely to break at any time and injure some of the other gears. Any repair made on this gear would be of an unsatisfactory nature. The wisest course to pursue is to secure a new gear to replace the broken one as soon as possible.

If, however, the question of cost enters, it may be best to try a simple repair, providing that conditions are not too bad. Suppose, for instance, that but two teeth side by side are missing. This can be remedied by screwing in two sets of pins to form teeth, or by inserting two tooth-shaped pieces with a dovetailed base in slots milled in the gear. Either method may be completed for a very small amount, less than $1 as compared with from $4 up to possibly $15 considering the character of the gear and the amount of work upon it. Then the delay is well worth considering, in fact, in most cases, it can be capitalized in dollars and cents.

Commercial Vehicle Tires in England

Mileages Obtained with S & C World and Giant Tires on London 'Buses, Peculiar Features—Continental Construction and Distance Records—Special Machinery at Avon Shops, Features and Mileages—Part III

By Arthur E. A. M. Turner

LONDON, May 11.—In continuing to deal with the best-known solid commercial car tires in Britain, the performances and construction of Giant and World solids turned out by Shrewsbury & Challiner at Arwick Green, Manchester, will prove interesting, as this make is used exclusively by the London General Omnibus Company, also Schweppes mineral water people with a large fleet of cars, and many others. They are made in suitable sections for loads from 15 cwt. (1680 lbs.) to 12 tons (long tons).

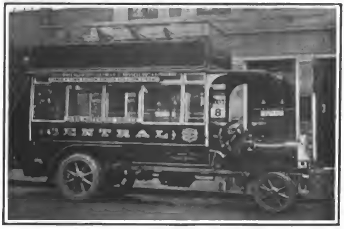


Fig. 11—The Whole of the Central 'Bus Fleet of Leyland Cars is Running on Shrewsbury & Challiner Tires. This Illustration Shows One of the 'Buses with Dual Rear and Single Front Tires. Note Also the Cast-Steel Wheels with Eight Oval Spokes

The single section tire is named Giant, while the dual form carries the designation of World. This is in the larger sizes, a lighter member in both single and dual forms being named M S Endless. The first named is made with either a flat or a round tread, while the World is constructed only in round sections. The latter as shown in the sketch below has a marked peculiarity, the rubber being in a single piece, although giving the dual shape with only a large fillet between the two near the base.

The foundation band of steel will be noted, this feature being the same on all S & C products. It consists of a continuous one-piece band of steel formed with a series of dovetail grooves around its circumference, between which are a series of large holes, cut through for superior holding power and lighter weight. The front end of the section is taken through the center of a cross row of holes, hence it is somewhat misleading. The whole effect is to give the rubber a more tenacious and permanent grip upon the metal.

With reference to the rubber section all of the advantages of a twin tire are claimed and, in addition, more freedom from skidding, greater resistance to lateral strains, as in turning a corner, and longer life due to more perfect union with a solid metal foundation.

Such results as anything up to 20,000 miles on 2-ton machines, 18,000 on 3-tonners, and the like, are quite common records, while a list of 32 by 4.5-inch Giants and 40 by 8-inch Worlds fitted to a fleet of delivery wagons made 16,935, 22,299, 35,703 and 20,971 miles, respectively, before being replaced. A specially light twin section for the driving wheels of 10 and 15 cwt. vehicles is marketed by the S & C Co., but is not pushed.

A solid rubber of fine quality, both of the band and pressed in section for commercial cars, is sold by the Continental Tire & Rubber Co., Ltd., which has just completed a huge building off Brompton Road, London, S.W. A

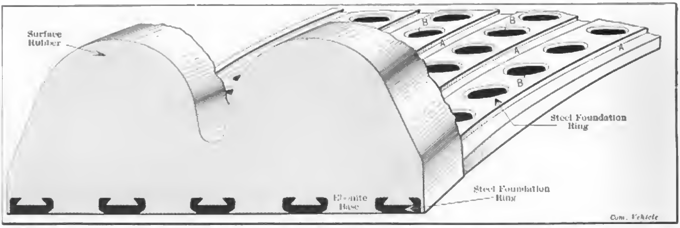


Fig. 12—Sectional Drawing of Shrewsbury & Challiner Dual Solid Rubber Tires, Showing the Form of Foundation Band Upon Which All of This Firm's Products Are Built Up. This Special Ring is Incorporated in the Ebonite Base to Which the Surface Rubber is United by Vulcanization. Differing from Most Dual Tires, the Latter is in One Piece, Instead of a Pair of Distinct Singles Set Side by Side and Thus Individually Removable

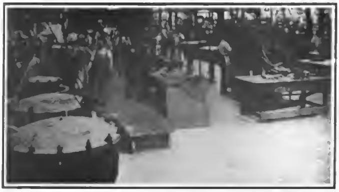


Fig. 13—Interior of the Avon Shops at Melksham, Wilts, Showing the Vulcanizing Kettles, Hydraulic Presses, Overhead Steam Supply Pipes, Clean Cement Floor, Abundence of Light from Above and Other Features Making for a First-Class Product

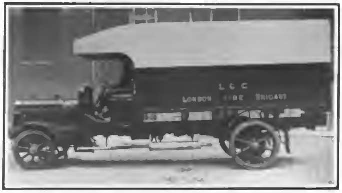


Fig. 15—One of the L. C. C. Fire Brigade Trucks Fitted with Continental Solid Rubber Tires of the T Pattern. This Vehicle, It Will be Noted, Also Has Steel Wheels with Oval Spokes, Eight to Each. The Diagonal Grooves Give a Herringbone Effect on Duals

point, however, which may very well bear allusion to is that, owing to the nature of the section called the T pattern it forms something of a non-skid as it wears, the edges of the rubber, owing to the somewhat concave nature of its sides, tending to press into the road surface should the vehicle roll. This Continental is made in sizes from 2 to 6.25 inches section, and is used a great deal with conspicuous success. All Thomas Tilling's 'buses are on T pattern Continentals, as are a good many of the L. C. C. Fire Brigade vehicles, and many 5-ton Bernas. Some of the most striking examples of the longevity of these rubbers have come, however, from the somewhat ill-paved town of Glasgow, where up to 40,000 miles and a little over has been got out of them while in use on 3-ton wagons. It was this make for which the mileages in the May number were given. They were of sufficient interest to warrant repetition.

Some Continental Tire Mileages

117 rear tires ran 2,220,088 miles, average 18,975 miles, on Tilling omnibuses.

57 front tires on the same cars gave 871,378 miles, an average of 15,278 miles.

The total of 174 tires gave slightly over 3,000,000 miles. The front sizes were 770 by 100 (30.3 by 3.94) and the rears 1010 by 120 mm (39.4 by 4.72). The nearest American equivalents would be 30 by 4 fronts and 40 by 5 rears.

Although the above makers do not push the pressed-in section rubber, they still sell a good number of that type, which are spoken well of by such firms as Shoolbreds, Harrods, Barkers, etc. Writing on February 14, for instance, the first-named firm said:

> We have had to date 186 Continental Clinched-on Tires from you; 5 of these have had to be replaced for not completing 10,000 miles, but, of these 5, two had been damaged in an accident, one had been fitted in error to a worn rim, so that only two failed to run 10,000 miles owing to an unknown cause.
>
> We have several of your tires on both hind and front wheels that have been running 10 months, and these have all done over 15,000 miles.
>
> We have never detected the slightest creeping of your Clinched-on tires, and we shall continue to use them for vans carrying loads up to 30 cwts.

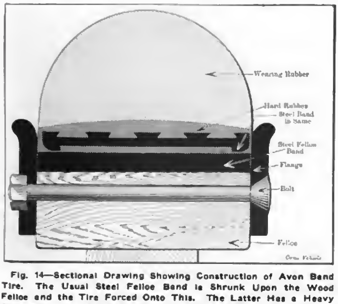


Fig. 14—Sectional Drawing Showing Construction of Avon Band Tire. The Usual Steel Felloe Band is Shrunk Upon the Wood Felloe and the Tire Forced Onto This. The Latter Has a Heavy Steel Band Incorporated in the Hard Rubber Base. It Has Four Dovetails in the Upper Surface to Help Hold the Rubber and Metal Together, While the Ebonite is Slightly Rounded on Top. To This the Wearing Surface of Softer Rubber is Vulcanized

One of the earliest companies in this country to take up the manufacture of solid-rubber tires was the Avon India Rubber Company, Ltd., of Melksham, Wilts. The business was established, as a small family affair, in 1885, and since that date steady progress has been made, until at present some 700 employees are engaged in the manufacture of tires and rubber "mechanicals."

Although the Avon company has been established for so many years, during the greater part of its career its works have been kept busy in the manufacture of proprietary tires, mechanical goods for railway use, such as vacuum brake rings, packing glands, etc., and in the production of cycle tires. With years of experience in the selection and blending of the mixtures and in the various processes of manufacture the management recently has decided to market solid tires for commercial motor vehicles under the company's own name. Both clinched and band-section tires are manufactured.

The development of the Avon company's business has been conducted on sound lines. At the time of the writer's visit a large new shop was in course of erection, which is to be devoted entirely to band-section, solid tires. The new building will be equipped with the most modern and suitable machinery. One of the new machines which has been installed recently is a universal rubber-washing machine. Unlike most other raw rubber washers, this has corrugated rolls, the effect of which is that instead of the materials being torn and shredded in order to separate foreign matter from the rubber it is kneaded systematically, by which process, it is stated, the life and nerve of the material are preserved to an extent which it has not been possible to attain otherwise. The corrugated rolls are enclosed completely in a water tank, and a cascade of water is directed so as to wash out all foreign matter as the mixture leaves the rollers. The machine is so designed that the gums can be washed with a flow of water running right through, as is usual with all ordinary open rollers, or with the washing water completely immersing them. When the rollers are completely submerged light foreign matter, such as pieces of wood, bark, etc., are floated off into side drains, while heavy foreign matter settles to the bottom and is trapped.

This firm has many records of tires which have done 12,000 to 21,000 miles, a pair on a char-a-bancs employed over unusually bad roads and giving over 18,000 miles being notable.

MAKING TRUCKS as done at Packard Factory

General View of the Packard Truck Buildings, Looking Toward the Main Factory, and Showing the Two Recently Completed Additions

As the country develops a real demand for commercial cars which will absorb a large total number each year, the shop facilities for producing these become of increasing importance. Probably no one firm in this country has progressed faster or farther in this respect than the Packard company, whose shops are illustrated and described.

This factory has at present a total floor space area of slightly more than 1,500,000 sq. ft., to be exact 1,565,862 or the equivalent of 36.93 acres devoted to the manufacture of motor cars. Of this enormous total 190,988 sq. ft. is given over to the truck department exclusively, in addition to a large amount of space which is utilized in common. The truck space amounts to 12.2 per cent. of the total floor area, but at the present rate of growth this division will assume a larger proportion very shortly.

In the general statement above the word present was used. This was done advisedly, for the work of adding to this factory has been and is to-day almost a continuous process. Once the statement was made that this company had not known a time since its removal to Detroit when some kind of an addition was not nearly completed, in process of building or being planned by the architects.

It may be interesting to give the size of the different departments of the truck shops, these taken in conjunction with the floor plans of the three buildings, shown herewith, giving an excellent idea of the general layout. The square feet of floor space and per cent. of the total for the truck departments are as follows:

Department	Square Feet	Per Cent
Assembling	39,840	20.8
Testing	37,100	19.4
Machine Shops	32,760	17.1
Non-Productive Area	22,728	11.9
Stock Rooms	18,220	9.5
Painting	16,000	8.3
Body Building	7,474	4.0
Sheet Metal	7,606	3.9
Blacksmithing	5,500	2.8
General	2,000	1.0
Inspection	1,760	.9
	190,988	99.6

The general layout of the whole shops is difficult to describe. In the main, it consists of one large four-story building along the north side of Grand Boulevard, Detroit, with an equally large extension or ell extending to the north.

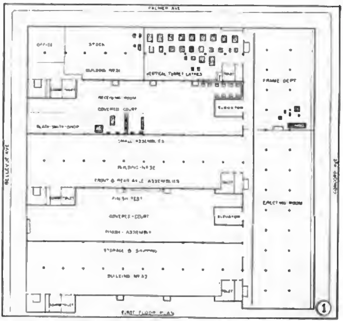


Fig. 1—Ground Floor Plan of Truck Shops, Showing Arrangement of Buildings Pictured Above

Fig. 2—View in Body Department, Showing a Low Stake Platform

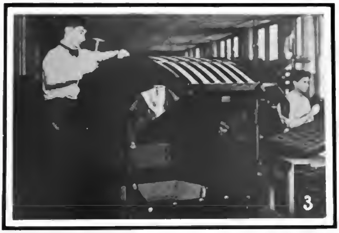


Fig. 3—In the Upholstering Department, Completing the Motor Truck Top Which Protects the Driver

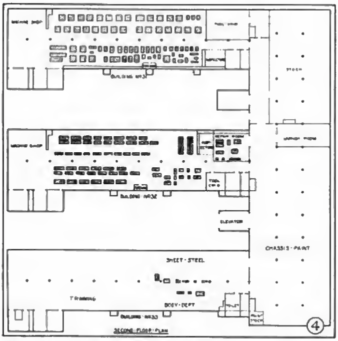


Fig. 4—Second Floor Plan of Truck Shops Where Most of the Machine Tools Are Located

while the other buildings are grouped back of or within this ell, some of them, like the foundry, being at some distance from the offices. Across the Boulevard is a smaller group consisting of the power plant and stock room on the street front and back of each respectively, the concrete coal bin and the truck shop.

The latter fronts on two streets which pass through that portion of the plant, namely, Bellevue avenue running north and south and Palmer avenue extending east and west. The original building was placed on the corner and had a short U shape, or perhaps it would be described better as a long, narrow rectangle with a projection on each end. At any rate, there was a notch cut out of the inside of it. When the second and third buildings were added they were built as duplicates of the first set some distance from it and connected by a wall at the Bellevue end and a portion as wide as the shops are deep at the other.

This makes the completed buildings form a modified letter W set parallel with Bellevue. The spaces between have been covered with a glass roof so as to form additional working area. With the wall at the front the picture gives the idea of three heights, of one, two and three stories, respectively. The one-story portion has just been described, the two-story portion is the main shop, while the apparent three-story part is but the upward extension of the elevator shaft. The foundations, however, were built for four stories.

The buildings are each 240 ft. long, while the wing or base of the letter W measures 322 ft. In construction reinforced concrete has been used throughout in combination with brick, steel, mortar, glass and cement, making the whole as nearly fireproof as is possible. By means of the two interior courts the second floors have uninterrupted light from three sides, while the ground floor light is almost as good on account of the glass roofs. This makes one of the best lighted shops in the country, it being well known that good light produces a maximum of efficiency. In addition this arrangement makes for unusual inter-department accessibility.

The upper floors are served by means of two large elevators, measuring 11 by 30 ft., but shafts have been provided for three others, 9 by 11 feet. Each of the present elevators has a capacity of 5 tons.

Ventilation is excellent and heating by a blast of hot air. The fan has a capacity of 80,000 cu. ft. a minute and can be arranged to draw return air only or that from the outside as desired. Sanitary drinking fountains are located all through the shop and other fixtures are correspondingly up to date. All cables run into the building through a tunnel.

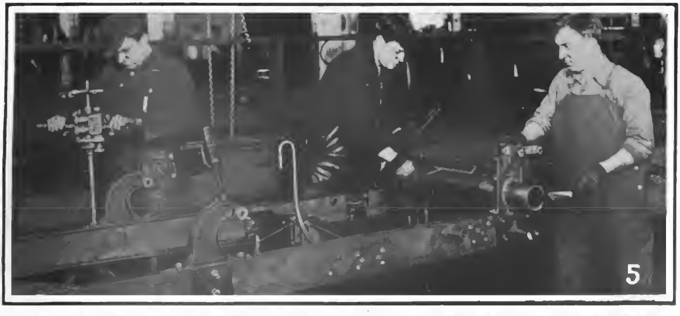


Fig. 5—In Assembly Room, Putting Chassis Frame Together with Aid of Jigs and Templates. Bolting on Countershaft Supports.

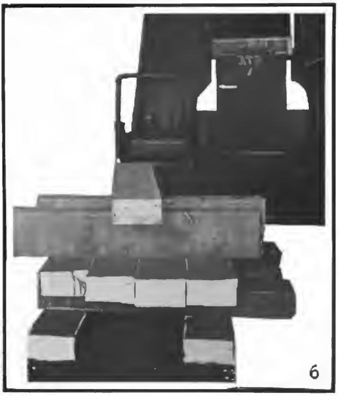


Fig. 6—Forging a Packard Truck Front Axle, the 200-Pound Steel Billets from Which the Axles Are Made and in the Background One of the Huge Hammers Used in the Process. In the Various Stages of the Work, No Less Than 20 Pounds of Metal Are Lost Unavoidable in the Various Treatments and Operations

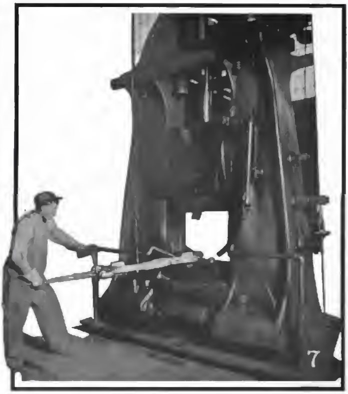


Fig. 7—Forging a Packard Front Axle, the Nearly Finished Product as It Approaches Completion Under the Hammer, Showing the Contrast with the Raw Material Depicted in Fig. 6. From a Long Rectangular Slab Before an Intricate, Formed and Well Proportioned Member Has Been Produced.

Fig. 8—Forging a Front Axle, the First of the Many Forging and Pressing Operations in Which the Shaped Axle is Evolved.

As to the manufacturing, the motor, transmission and countershaft unit or bridge, as it is called, and the clutch are produced in the main shops with the pleasure motor, transmission and clutch. Aside from these the forgings from the general forge shops and the castings from the general foundry, the truck buildings are self-contained and all other parts entering into the truck construction are made within them.

To do this requires over 500 men, while the entire shops employ close to 7000, the exact figure on April 16th being 5449. This shows that the trucks account for about 10 per cent. of the total. The estimated value of the 1912 output is given as $6,000,000 for the trucks and $15,000,000 total, the former thus constituting 40 per cent. of the whole. The semi-monthly payroll in April was $200,000. Considering this as an average for the entire 12 months, the yearly total would be $4,800,000. Considering 5400 as the average, the yearly payment a man would be about $900, or close to $3 a day, for each and every worker. During March the output was better than five trucks a day, the last of the month showing 16 for the day's shipment. In April the manufacturing pace was increased so as to average six trucks a day.

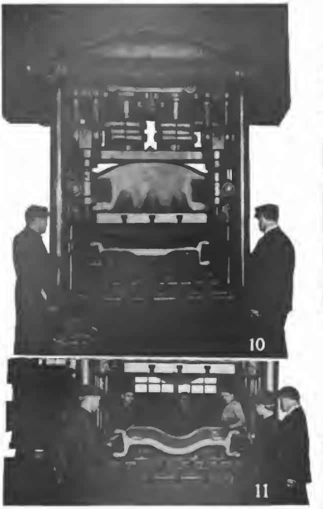
Many interesting illustrations herewith bring out interesting scenes or processes around the plant, of which lack of space forbids a description. In particular an entire set of views of the construction of a front axle is shown, from the rough slab to the assembled product. To begin with, the truck axle is but a bar of steel, 32 by 6 by 3.5 in., and weighing 200 lb. After passing a shop test it is heated by pyrometer-governed furnaces to 1950 degrees Fahr.

The first operation is drawing the center, which lengthens the bar and leaves a protuberance at each end. In a working day 40 can be put through or at the rate of one in 14 minutes. The piece is blocked out by a roughing die and the arms of the yoke punched out in the next operation, which requires two reheatings. Twenty are handled a day. The steering yokes are shaped and finished in a third forging operation, which also requires reheating for the work on each end of the axle. The average on this work is 20 a day. The axle is then put under a forging hammer and drawn to length, the limit at this stage being one thirty-second of an inch. This operation also smooths out the center. The blacksmith handles 50 a day or 11 minutes each.

After being reheated the axle goes into the 1000-ton press, which gives it the drop curve. It takes 2 hours to set up the press and 75 axles go through in a day. After being heat treated the axles go back to the forge to be finished. This work is very exacting and an hour is expended on each piece. When finished the axle weighs 185 lb.

Milling the spring pad takes 55 minutes. The second machine operation mills the steering yokes, taking in both inner and outer surfaces of the top and bottom extremities in one trip through the machine. This takes 50 minutes. Then the drilling and boring is done

This makes the whole forging time 164 minutes plus two heatings, heat treatment time and initial and final inspections; machining time 105 minutes plus handling, drilling, boring and inspections; assembling time 285 minutes plus inspections; a total of 554 minutes or 9 hours 14 minutes. Allowing for the other operations, this makes the total about 624 minutes, or at the rate of five a week.



Figs. 10 and 11—Following Rough Forging Comes the Finish Operation, the Drawing to Length and Finally Bending the Curve

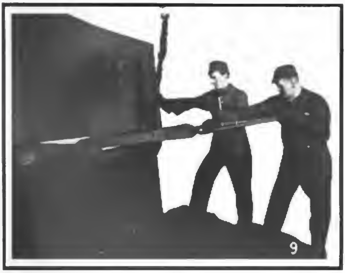
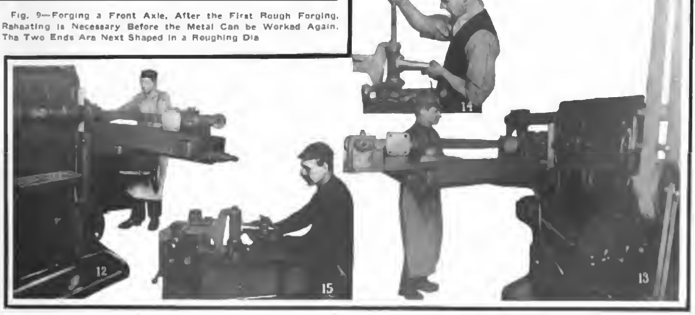
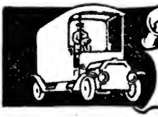


Fig. 9—Forging a Front Axle. After the First Rough Forging, Reheating Is Necessary Before the Metal Can be Worked Again. The Two Ends Are Next Shaped in a Roughing Die



Figs. 12-15—Forming a Packard Front Axle. In the Machining and Assembling There Are Many Different Operations, One Following the Other. In Fig. 12, the Spring Pads Are Being Faced Off in a Milling Machine, While Fig. 13 Shows a Similar Machine with a Gang Miller Facing the Top and Bottom Surfaces of Both Parts of the Yoke. The Man in Fig. 14 Is Fitting Together Axle, Steering Knuckle and Knuckle Pin. Fig. 15 Shows the Fitting of the Pair of Roller Bearings on the Spindle of the Steering Knuckle



The TRUCK MAKER'S MARKET

THE past month has been marked by a wholesale adoption of motor-driven fire-fighting apparatus on the part of medium-sized cities. This is in marked contrast with what has happened in the past, the larger cities having been the biggest, in fact, almost the only, buyers. Now that the country's largest municipalities have placed their seal of approval upon motor apparatus, the smaller places seem to be vieing with one another to see which can buy the largest number of pieces or eliminate horses most quickly.

Thus there is little remarkable in cities of about half a million inhabitants, such as Pittsburgh, Montreal, Baltimore or Detroit, being in the market for six, three, five and six cars, respectively, but there is much food for reflection in the situation among smaller cities. Sacramento, Cal., and Salem, O., with respectively but 45,000 and 9000, both want to motorize the entire department. Of the cities now in the market for apparatus, as noted below and on the opposite page, special attention is called to two cities of less than 5000 people, each in the market for two cars, namely, Cœur D'Alene, Idaho, and Sac City, Ia.

Between these two extremes a number of larger cities have shown a marked disposition to purchase, as, for instance, Springfield, Mo., with 36,000, wants five pieces; Shreveport, La., with but 29,000, five; Tampa, Fla., with 38,000, wants two; Revere, Mass., with 19,000, wants two; Richmond, Cal., with but 7000, wants two, and so on. All this just goes to show what great progress has been made and is being made in motor-driven municipal apparatus.

There are more than 6300 cities of 2000 population and over in the country. An average of two machines each, less those now in use, would give a market for 11,700 cars. Adding 25 per cent. for population increase of the near future, this figures out to an average of approximately 120 cars a month for the next 10 years. At the present rate of increase this figure will be exceeded within the current year.

Moreover, all this is business of the highest grade, New York City, for instance, having set an unusually high standard, its specifications being framed to permit of bidding only on the very highest class of workmanship and material. It is understood that a still higher standard is back of the recent action, in which all bids on 26 second size combinations and hose wagons and three high-pressure wagons were thrown out and will be readvertised.

This field of fire apparatus alone represents a purchasing power within the next 10 years of not less than $77,000,000, an average of over $7,700,000 a year or $641,000 a month.

The city officials of Hopkinsville, Ky., are considering the purchase of motor apparatus for its fire department. Mayor Meacham is in charge of the matter.

New Albany, Ind., is considering the appropriation of $4,000 for the purchase of a motor truck for the fire department.

Unless the appropriations be changed in the near future, Evansville Ind., will purchase but one motor fire wagon this year.

The Newcastle, Ind., fire truck has been put into service, replacing one of the old chemicals.

The Board of Public Affairs of Hot Springs, Ark., has contracted for a triple combination pump, chemical and hose wagon for that city.

Fire Chief Anderson, of Sacramento, Cal., has proposed in his estimate for the fiscal year that the entire department be motorized, following the lead of San Francisco. The chief figures that a small purchase of motor apparatus would save the city about $20,000 a year, from which he would purchase two steam fire pumps and two motor pieces each year, thus replacing all old apparatus with new in three years.

The city council of Los Angeles has authorized the purchase of a six-cylinder, 135 horsepower motor driven engine at $10,000. This must be delivered within five months.

Eureka, Cal., is considering the purchase of a motor-driven chemical. This matter will be settled definitely before the first of June

Richmond, Cal., has received its new combination fire truck and chemical. This was purchased by a volunteer company which raised the money by private subscription.

Two motor-driven hose and chemical wagons have been requisitioned of the city council of Tampa, Fla., by the fire department, and bids will be advertised for shortly.

Albany, Ga., has purchased a $5,500 motor truck for its fire department.

Cœur D'Alene, Idaho, will vote upon the proposition to spend $15,000 for motor-driven fire apparatus at the forthcoming municipal election. With this money the fire department proposes to purchase a combination ladder service, chemical and hose wagon and a combination pumping engine, hose and chemical.

In Des Moines, Ia., a fire commission is considering the problem of modernizing the city fire department. The present plan is to purchase four motor-driven pieces, two combination hose and chemical wagons, an engine and a tractor for the aerial truck.

The citizens of Dubuque, Ia., are complaining of the delay in purchasing the motor-driven fire truck. A tax was levied for this purpose and bids asked for, but the contract was not let.

Sac City, Ia., has purchased two motor chemical engines for the use of its fire department.

Marshalltown, Ia., has accepted the fire truck, which has been the subject of considerable controversy in the city council.

Oakland, Cal., received bids for a motor-driven chemical engine up to May 27. Frank R. Thompson is city clerk.

West Bluffs, Ill. (Peoria), is to purchase motor apparatus, the decision having been made to equip the Main street house exclusively with motors.

A number of residents of Lake Forest, Ill. (Waukegan), have petitioned the city council to purchase modern motor-driven fire apparatus to protect their property in an adequate manner.

Specifications for the new combination chemical, hose and ladder truck for Sterling, Ill., are being prepared and will be asked for some time early in June. This city is also in the market for a motor street flusher.

This month Baltimore will join the ranks of well equipped cities, having four motor-driven pieces coming. Another piece, a hook and ladder combination, has been asked for by Roland Park, just outside the city.

Revere, Mass., early in the month voted to buy a combination fire wagon and an automobile for the head of the fire department.

Mayor Fitzgerald, Boston, is worried over the attitude of the city council ignoring his message urging an appropriation of $42,000 for motor fire apparatus.

Kalamazoo, Mich., is about to purchase a combination patrol and ambulance. Police Chief Struble has been visiting other cities which have such apparatus.

Detroit received bids to May 27 on fire engines, one ladder truck, rebuilding another ladder truck, combination hose and chemical, flying squadron car and battalion chief's car.

Minneapolis has chosen a site for the new Lake Harriet fire house, which will have only motor-driven apparatus.

Fire Chief P. P. Kane, St. Joseph, Mo., has recommended the installation of motor apparatus at half of the city's fire stations.

Fire Chief Hiram McLaughlin, Springfield, Mo., will purchase five motor-driven pieces with a portion of the $50,000 voted for improvements in the fire department at the recent election.

Three pieces of motor apparatus will be purchased immediately by the Montreal (Can.) fire department for use at the Craig street headquarters. It is understood that these will be ordered from the Canadian factory of the Seagrave Company a Walkerville, Ont.

Fire Commissioner Johnson, New York City, has thrown out all of the bids recently received for supplying the city with motor fire apparatus, with the exception of the two first size wagons which were awarded the International Motor Company (Mack). Bids will be readvertised shortly. The majority of these cars were combination chemical and hose wagons for the outlying stations of Brooklyn.

Hose Company 2, Dunkirk, N. Y., has received its new motor fire wagon from Elmira, N. Y.

Plans for the motor fire truck for Akron, O., have been completed and the specifications turned over to Solicitor Taylor in order that bids may be advertised for.

The plan to equip the fire department and ambulance service of Salem, O., with motor apparatus is meeting with much favor.

Massillion, O., has passed a bond issue of $4,000, which will be used in changing combination chemical and hose No. 1 from horse-drawn to motor driven.

The council committee on Ways and Means of Cincinnati has decided to recommend in council a bond issue of $160,000 to be used for improving the fire fighting service by the addition of motor-driven pieces, to be located mainly in the newly annexed villages and outlying parts of the city.

The public health and safety committee of city council, Springfield, O., has recommended the issuance of bonds in the sum of $15,000 for the purpose of providing additional motor fire apparatus and a motor patrol for the police department.

Bids have been opened by Zanesville, O., for a new motor fire engine, but the contract has not been let. In anticipation of this purchase a fireman has been appointed to man it.

Marion, O., has received and has put into service the new chemical and hose wagon. This underwent a strenuous test before acceptance.

A 110-horsepower triple combination fire engine has been ordered by Marietta, O., from the Robinson company, St. Louis, as a result of the recent bidding.

Bids closed May 14 for a combination chemical and hose wagon, two combination pumping engines and hose wagons, a tractor to pull an aerial truck and a chief's car at Shreveport, La.

Swissvale, Pa., closed bids on May 2 for a combination chemical, hose and ladder wagon.

The Yorkville Hose Company, of Pottsville, Pa., has placed an order for a White combination chemical and hose wagon.

The Knox company was awarded the contract for a motor-driven fire truck to be located at the South Side station, Butler, Pa.

Pittsburgh has placed orders for three pieces each with the Knox and American-La France companies. These are chemical and hose wagons.

The Lents, Ore., volunteer fire company is negotiating for a motor-driven chemical engine.

Victoria, Tex., recently held a city firemen's celebration to raise money for a new motor-driven chemical.

Salt Lake City has received its Garford car, which is to be used by the chief of the department.

The chief of the fire department, Richmond, Va., has recommended the purchase of another motor fire engine for use in the Ginter Park district. The other, which cost $12,000, is located in the heart of the city.

Bellingham, Wash., is considering the purchase of a combination piece for its fire department.

During April and part of May, the Knox company sold apparatus to the following cities: Pumping engine and three chief's cars to Richmond, Va.; single tank combination wagons to Newton, Mass., Attleboro, Mass., W. Hoboken, N. J., Springfield, Mass. (2), Niagara Falls, N. Y.

Birmingham, Ala., has adopted an ordinance providing for the payment for the six motor hose wagons recently delivered to the city. The city agrees to pay $8600 in cash and to execute five notes of $4000 each, bearing interest at 5 per cent and payable semi-annually.

Kissimmee, Ala., has purchased a motor hose and chemical.

Fresno, Cal., has accepted a motor chemical on a 90-day trial.

Hillsboro, Cal., has $15,000 with which some motor fire apparatus will be purchased.

National City, Cal., has purchased an 80-horsepower motor hose and chemical.

Oakland, Cal., has received two motor fire trucks.

Visalia, Cal., has purchased a motor fire truck.

Leadville, Col., has purchased a motor fire truck which will be paid on the installment plan.

Hartford, Conn., has ordered three motor hose and chemical wagons and two officers' cars, to cost $15,900.

New Canaan, Conn., has received a motor hose and chemical.

New Haven, Conn., has purchased a motor pumping engine.

Norwich, Conn., has installed a motor hose and chemical.

Athens, Ga., has purchased a motor fire truck.

Dawson, Ga., has purchased a $6000 motor hose and chemical.

Elgin, Ill., is investigating motor fire apparatus with a view to buying later.

Moline, Ill., has ordered a motor hose wagon.

Bluffton, Ind., has installed a $4000 motor fire truck.

Fort Wayne, Ind., has purchased a motor chemical costing $3950.

Marion, Ind., has installed a motor fire truck.

South Bend, Ind., has a motor chemical and a fire chief's car has been ordered

Burlington, Ia., has asked for bids on a combination motor fire engine, aerial truck and chemical to travel 35 miles an hour.

Waterloo, Ia., has a motor-operated siren on their fire truck.

Atchinson, Kan., has appropriated $7000 to pay for one-half the contract on its two pieces of motor fire apparatus. The rest will be paid later.

Hutchinson, Kan., has purchased a motor fire engine and motor chemical.

Topeka, Kan., has received a motor wagon for the use of the fire chief.

Covington, Ky., has installed a motor chemical.

Louisville, Ky., has voted to purchase another motor fire truck.

Annapolis, Md., has purchased a motor fire engine costing $8000, raised by public subscriptions and festivals, etc.

Catonsville, Md., has a motor engine and chemical.

Everett, Mass., has installed a motor chemical.

Haverhill, Mass., is considering the purchase of motor fire engine.

Holyoke, Mass., is planning to equip its motor fire apparatus with self-starters.

Ipswich, Mass., has a motor hose and chemical.

Lynn, Mass., has purchased a motor pumping engine, costing $8000.

Nahant, Mass., anticipates installing a motor fire engine shortly.

Nantucket, Mass., has ordered a motor chemical.

New Bedford, Mass., has appropriated $4664 for a motor wagon chassis for its fire department.

Salem, Mass., has installed a motor chemical.

Springfield, Mass., has received the chassis for a new electric combination hose wagon.

Stoneham, Mass., has voted $5900 for a motor fire truck

Wakefield, Mass., has ordered a $5500 motor fire truck.

Muskegon, Mich., has advertised bids for a fire and general utility automobile.

Duluth, Minn., has bought a $2500 automobile for its fire chief.

Waconia, Minn., will purchase a motor fire truck.

Vicksburg, Miss., has installed a $4800 motor hose wagon.

Benson, Neb., will purchase a motor fire truck.

Fremont, Neb., has received its motor fire wagon.

Lincoln, Neb., has installed a $7500 motor combination pumping engine and hose truck.

Omaha, Neb., has installed a motor hose and chemical.

Nashua, N. H., has appropriated $6000 for a motor fire truck.

Camden, N. J., has bought two motor combination chemical trucks for $9000

Hoboken, N. J., has purchased a fire chief's car for $2090.

Montclair, N. J., has ordered a triple combination motor fire truck, also a motor ladder truck costing $13,500.

Morristown, N. J., has purchased a motor ladder truck for $5650.

Princeton, N. J., will receive its motor fire engine on or about June 17.

Ventnor, N. J., has purchased a motor fire engine costing $9000.

Albany, N. Y., has installed a motor fire truck.

Binghamton, N. Y., has a motor ladder truck

Elmira, N. Y., has decided to purchase a motor fire truck.

Matteawan, N. Y., has purchased a motor hose and chemical.

Sleepy Hollow, N. Y., has purchased a motor fire truck.

Watertown, N. Y., has ordered a motor hose and chemical.

West New Brighton, N. Y., has received its motor fire truck.

Charlotte, N. C., has installed a motor fire truck which cost $5000.

Lorain, O., has purchased two motor fire trucks, costing $14,125.

Toledo, O., has bought a $1300 car for its fire chief.

Muskogee, Okla., has installed another motor fire truck.

Connellsville, Pa., has ordered a $5750 motor fire truck.

Kittanning, Pa., has purchased a motor fire truck

Homestead, Pa., has purchased a 70-horsepower motor fire truck, costing $5000.

Shenandoah, Pa., has received its motor chemical.

Sunbury, Pa., has ordered a $2500 motor hose truck.

Washington, Pa., has purchased a motor hose and chemical.

Anderson, S. C., has installed a motor fire truck, costing $5500.

Greenwood, S. C., has bought a combination motor hose and chemical.

Orangeburg, S. C., has on order a motor hose and chemical, costing $5500.

Georgetown, Tex., has bought a motor fire truck.

Houston, Tex., has installed a combination motor pumping and hose wagon, and will shortly have delivered a motor aerial truck and a motor service truck

Lockhart, Tex., is considering the purchase of a $5500 motor hose and chemical.

Vernon, Tex., has bought a $5500 motor hose and chemical.

Salt Lake City, Utah, has purchased a $5500 motor hose and chemical and a $4500 fire chief's car.

Staunton, Va., has purchased a motor fire engine.

Tacoma, Wash., has eight pieces of motor fire apparatus in service and shortly will be in the market for more.

Grand Rapids, Mich., which has available a part of an appropriation of $20,000, is motorizing its department very cautiously. The police department has a combination patrol and ambulance, which was bought out of this fund.

Columbus, O., will purchase four motor-driven combinations and six tractors for steam fire engines and ladder trucks. This apparatus will be installed within 90 days.

Findlay, O., is considering the purchase of motor apparatus.

The Indianapolis board of school commissioners is in the market for a seven-passenger touring car.

An appropriation of $4500 has been asked for by the city board of health, City Hall, Indianapolis, for the purchase of a gasoline ambulance for the city hospital.

The firemen of the Minneapolis department have built in the repair shops there a combination chemical and hose wagon on a Wilcox chassis. This will be tried out at the firemen's convention and if successful more will be built. Ready for business, the machine weighs 8140 pounds.

The board of estimate of Detroit has set aside $17,500 for the purchase of additional motor patrols and other fire equipment. All of the present patrols are motor-driven but the rapid growth of the city has necessitated additional cars.

The Detroit park department is about to buy three more motor buses of the pay-as-you-enter type to seat 27 persons each. The sum of $18,000 has been set aside for this purpose.

Bridgeport, Conn., will try to eliminate all horses from its fire department in the near future, according to Wallace G. Taylor, president of the board of fire commissioners. The board of health has purchased a Ford runabout for the Health Officer. This is arranged to carry fumigating material. Fire Chief Mooney has a new car. A tractor has been rigged up for engine 1 from a Locomobile chassis.

The Vigilant fire company, York, Pa., is contemplating the purchase of a chemical engine.

Fire Chief Quigley, Syracuse, N. Y., has recommended that all the city's apparatus be changed from horse to motor-driven. The aldermen are considering the subject, but fire department officers are so enthusiastic about it that they are talking of buying cars out of their own pockets.

Auburn, N. Y., is soon to buy several pieces of motor apparatus.

St. Louis is in the market for several motor cars. A third ambulance is wanted for the City Hospital, and three trucks are desired by different city departments. The street commissioner wants a 5-ton vehicle, the park department one of 2 tons capacity and the water department a smaller car. The city is soon to purchase a fleet of runabouts for the inspectors in the street, water, park and sewer departments.

Arlington, Mass., is in the market for additional motor fire apparatus.

Middleboro, Mass., is in the market for several vehicles as a result of recent special legislation allowing the town to borrow money for this purpose.

Brookline, Mass., has installed three vehicles in the fire department, has just bought a car for the chief of police, and is about to buy a motor patrol.

Cambridge, Mass., is investigating motor fire apparatus, a special committee of the board of aldermen having been appointed for this purpose. It is expected that an appropriation will be made shortly for several combination chemicals.

Boston has appropriated $50,000 for fire apparatus and Fire Commissioner Cole proposes to purchase 13 machines with this money, as follows: Three combination chemical and hose wagons, three combination ladder trucks, and seven machines for district chiefs. The announcement calling for bids on these appeared only in the Boston City Record. The police department needs additional cars. A White has just been purchased for Roxbury, and Councillor Buckley intends to offer an order at the next meeting appropriating money for 10 or more additional, divided one for each suburb and two for the city proper. As a result of a subway accident, after which injured persons were forced to lay on the ground for half an hour or more, several motor ambulances will be purchased.

The aldermen of Somerville, Mass., have passed appropriations of $5000 for a chemical and hose motor fire truck.

Pope-Hartford Chief's Cars in Service of Hartford, Conn., Fire Department

Insuring the Commercial Vehicle

The Kinds of Insurance in Force, Cost, State Regulations Relative to It, Attitude of Agents, Dealers, Owners and Manufacturers—Why It Costs Too Much and How It Can Be Lowered

Part III—Differences in Other States

> Digest of Part III—Other States
>
> *IN Jersey, an employee's compensation act would permit double damages except that all liability policies carry a special endorsement to take care of this.*
>
> *A SPECIAL policy known as the "open dealer's" form makes it possible for the selling agent to pay his premiums out of the profits.*
>
> *THE majority of New England firms are partial to self-insurance, carrying only fire with the elimination of the theft clause.*
>
> *OHIO has a workingmen's compensation law, but it is optional. Little insurance is carried.*
>
> *A SPECIAL liability policy is in force in Kentucky in which a distinction is made between the wholesale and the retail delivery of any line of business, the former being considered less hazardous.*

IN the two previous installments, the insurance situation in New York State and City was outlined briefly and the attitude of a number of manufacturing firms, agents, dealers and users of commercial vehicles given. The four kinds of insurance were mentioned and the rates for each given, but this is considered important enough to repeat.

There are four kinds of motor truck insurance, designated usually as 1. Fire. 2. Collision. 3. Liability, and 4. Property damage. The first named covers losses or damages through fire anywhere and at any time, also losses through theft or during transportation from one place to another. There are two kinds of policy, the valued and the non-valued, meaning placing a high value upon the machine and not doing so. The latter costs less. Theft may be waived also, in which case the annual premium is less. The cost of this form is figured at a flat rate, found by multiplying the value of the car when new by a fixed per cent.

This refers primarily to the new car insured for its whole value, as when the insurance is less than the total value the rate is higher. Moreover, as the car grows older, the rate increases up to a certain point where the companies refuse to issue protection upon it. Generally speaking, the higher the amount asked for up to the actual total cost, the lower the rate. When a higher amount is asked for than the vehicle cost, the rate is higher also. In New York State, the minimum rate on a new car insured for full value is 2.25 per cent., but this may be reduced slightly by taking advantage of the private garage clause under which a private car in a private garage is allowed a 20 per cent. discount from the usual rate. Considering a new 3-ton truck costing $3,500 and insured for that amount, the annual premium would be $78.75 normally and $63 with the private garage clause.

Collision insurance is written upon the supposition that the danger varies with the nature of the business and bears no relation to the size, cost, age or other items. For this purpose all businesses are divided into classes, with a flat rate in each class. Under this arrangement no claim is recognized for less than $25 and tires are not covered unless the damage claim exceeds $200. The policies are made out in two forms, called the Deductible and Full Coverage. In the former, the cost is 2.4 per cent. of the manufacturer's catalog list price plus full equipment cost with a minimum yearly premium of $30. On this basis, $25 shall be deductible from each claim and insurance is paid for loss or damage only in excess of that amount. If the 3-ton truck selected for illustration had no equipment the annual premium would be $84. With the Full Coverage arrangement, there is no deduction and the car owner pays $35 a year more, in the case cited, $119.

Liability covers damages resulting from accidents to other persons, the usual minimum being $5,000 for one person, or $10,000 for one accident. For these limits there is a set rate, but if it be desired to have protection in greater amounts, they may be raised by paying a larger premium. The cost is based on the horsepower of the vehicle, but is quoted to owners in a lump sum. The country is divided into districts, with different schedules in each. Within each district, the cars are grouped, with a price on every different business, these making up the schedule. This form may be taken out separately, but is closely allied with property damage.

Thus, if the car used as an instance above was in express service, its owner would pay $175 a year for liability in New York City and $70 for property damage; in Boston in the same service $150 and $60; in Providence, R. I., $125 and $60, etc. In a sense, this puts a premium upon doing business in the largest cities, for the premiums are largest in these cities of the greatest population and least in the smaller places. This is but natural, however, for the greater the congestion, the greater the risk, and there is no question of the congestion in large cities.

To explain property damage insurance, this covers the damage to other people's property inflicted by the motor truck. For the usual form, it is taken out in multiples of $1,000, no amount being written for less than $1,000, while there is no upper limit. The charge for the first $1,000 is a flat figure (as quoted), varying with the nature of the business and the location, the premium being figured as 40 per cent. of the liability premium. Each additional $1,000 costs an additional 10 per cent. of the liability premium or one-fourth of the premium for the first $1,000.

Summing up the figures which have been given separately before, the total insurance in the four forms are as follows. In this connection it may be repeated that the truck is a standard 3-ton make, rated at 40 horsepower, is new, cost $3,500, including all equipment, is insured for this full amount under fire and is used in express service in New York City. Under liability the usual minimum is not exceeded, and under property damage only the $1,000 minimum is carried. The figures:

Fire, theft and transportation	$78.75	
With private garage clause		$63.00
Liability	175.00	
Property damage, minimum	70.00	
Add for each extra $1,000		17.50
Collision, with full coverage	119.00	
$25 deductible form		84.00
Total	$442.75	
Total, if $5,000 property damage be carried		$510.00
Total, if private garage clause can be taken advantage of		427.00
Total, if $25 deductible collision be considered		407.75
Total, including private garage and $25 deductible savings		392.00

This is practically the minimum which can be reached if all four kinds are carried at once.

Situation in New Jersey

JERSEY does not have many radical differences from the New York and national situation as outlined above, the principal ones being the following: A few independent companies quote cut rates, but these are very close to the usual figures; very little collision insurance is written, the majority of insurance firms avoiding it wherever possible; by law, companies are restricted to one of three classes of insurance, these being (1) fire and marine; (2) life and accident, and (3) all others; employer's liability law is in force and complicates the liability insurance situation.

Under the employer's liability or workingmen's compensation act provision is made for all injuries received while in daily occupation in the service of the employer. The actual figures are fixed for all of the larger injuries as well as the more common minor ones. To protect the employer against double damages under this act all liability policies have a special endorsement, by means of which the employee signs away his claim under this particular act.

The classes under liability and property damage are practically the same as in other states. No reduction may be obtained by insuring a large fleet at one time with one company. A special policy, known as an "open dealer's" policy, presents some items of interest. Under this a dealer is insured as per "pass book," this containing a list of the cars in his salesroom with the catalog value of each. As fast as a car is sold it is marked off in the book and a pro rata payment made for it. In this way the dealer is able to pay his insurance premium out of his profit on the car.

Conditions in New England

WITH typical New England caution the inhabitants of Boston and other cities owning motor trucks carry no more insurance than they consider absolutely necessary. The majority of owners carry fire insurance, dropping the theft clause so as to gain the one-half per cent. remitted by the insurance companies when this is left out. Many of the larger companies insure themselves by setting aside an annual amount to take care of the possibilities.

The rates under the four divisions are the same as elsewhere, but New England is divided into three portions, to which the three liability, property damage and collision schedules apply. Boston and vicinity come under No. 1, Providence and vicinity under No. 2, and the rest of New England, except Connecticut, in No. 3.

In Rhode Island any company may write any form of insurance, which simplifies the situation markedly in that an owner may obtain all his insurance, if he chooses to take out all four kinds, from a single agent in the form of a single policy and make but one annual premium payment for it. In this state, too, fire rates show a minimum of 2 per cent. Otherwise, all conference rates apply. There is no special legislation on insurance and no workingmen's compensation law. There is no reduction for a large number of cars, the same applying to the balance of New England.

The Situation in Ohio

OHIO has a workingmen's compensation law, but this is not compulsory: that is, the workingman injured may accept compensation under the law or reject the same and bring suit under the old common law, whichever method will bring him the greatest amount of money.

Aside from this peculiar feature, there is little difference between Ohio and other states. The fire premium minimum is 2.25 per cent. and the method of obtaining it is the same as elsewhere. Collision premiums are figured on the basis of 2 per cent of the original cost price. All companies may write all kinds, but few of them do. The general rule divides insurance into two classes, fire and liability, concerns in the former writing nothing else, while those in the latter class handle all others. There are a few independent companies and they quote slightly lower figures than the conference.

Of three different firms in widely varying lines of business, no one of the three has ever carried any insurance whatever. Strange as it may seem, no one of them has ever paid out any money in the way of damages or paid any losses.

Lower rates may be obtained on a fleet of cars than on one, but this matter requires reference to the home company and causes considerable delay.

Insurance Matters in Maryland

THE line of demarcation between the different companies is the same in Maryland as in New York; that is, casualty companies may not write fire insurance and vice versa. All four forms are in use. There are few independent companies. Combination rates may be had only when one car is operated at a time. The question of a reduction for a big fleet has never come up, for there is no one firm in the state with 10 cars. Conference rates apply to all forms.

Conditions in Kentucky

IN the Bluegrass State all companies may write all forms of insurance, but until recently this has not been done, and the natural division of all other states into fire insurance and all other kinds has applied. All four forms are in use with conference rates charged. No saving is effected by insuring a large number of cars, the same being true of the life of the policy, 5 years costing just five times 1 year.

A notable special policy is now being offered, this being designed to apply to local conditions with peculiar force. It is a liability policy, in which a difference is made between a wholesaler and a retailer in the same line of business, the former getting a much lower rate. The reason given for this is that the wholesale business is more safe in that a less number of trips a day are made by the trucks, whereas none of the work is as hurried as in retail delivery.

Differences in the Other States

THERE is little to add on the part of other states, the majority of them following out conference rates and policies. In Wisconsin the law divides all insurance companies into two broad divisions, fire and life, but under the latter the wording is such that anything in the line of collision, liability or property damage may be written. Owners are favorable to fire, either with or without the theft clause, and in some few cases to liability. Other kinds are not used.

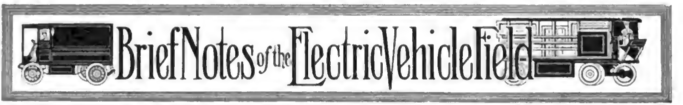
There are no limitations in Illinois except as imposed by the company's own charter. All forms are in use, conference rates applying. No reduction is made for fleets of cars. There are combination policies for fire and collision, but liability is always separate.

In California all forms are in use, and there are no state restrictions. There are no cut rates on fleets. The general attitude is favorable but few firms carry all four kinds.

In Delaware fire companies may not write casualty and vice versa. All four forms are in use, but there are no combination policies used. There is no reduction in quantity. Owing to the small number there is little business done.

Pennsylvania follows conference rules and rates. The only difference noted is in collision insurance, this being written at a straight 2 per cent. rate with a $15 deductible average which is never waived.

Missouri is a conference state as well. The recent law (1911) allows of all companies writing all kinds of insurance.



Brief Notes of the Electric Vehicle Field

THE month from April 15 to May 15 has been particularly active one in the field of electric vehicles for commercial uses, big sales having been made in certain quarters and other developments having taken place. In the matter of sales the most important has been the purchase of 85 electric vehicles by the Adams Express company, 42 of these coming from the General Vehicle company, 35 from the Commercial Truck company and eight from the Atlantic company.

In addition to these selling activities there have been many others. The Waverley company reports a total of 45 vehicles sold during this period, the two major orders consisting of 21 to the Fleischman company, New York, and 10 to Mandel Bros., Chicago. The Anderson company reports many sales, among the high marks being a fleet of 15 to Hearn & Sons, New York, and another fleet of six to Washington, D. C.

There was organized during the month the Chicago section of the Electric Vehicle Association of America. This organization took place on May 7 at a complimentary dinner given by the Commonwealth-Edison company to 75 of the leading electrical people of the city. The occasion was emphasized further by a reduction of 20 per cent. in the cost of electric current for charging in Chicago at off-peak hours of the day by this company. The new organization started off with a membership of over 35.

Two other factors have been particularly active during this period; one has been the invigorating campaign of the central station interests in Boston for the general good of the electric vehicle industry. The other has been the issuing of a 44-page report by the Massachusetts Institute of Technology on the relative cost of delivering commodities by electric trucks, gasoline trucks and horse vehicles. The report contains a mass of tabulated data collected by students of the institute who traveled on all types of vehicles in city operation and collected information on all of the varied aspects of cost. In order to obtain accurate information a tape record of the different electric vehicles and others was obtained and the information published has been taken from these records. The Boston electrical interest were back of the report, so far as financing the collection of data was concerned.

Western Section of E. V. A. Organized

CHICAGO, May 6.—The organization of the Chicago Section of the Electric Vehicle Association of America took place in this city this evening at a dinner given by the Commonwealth-Edison Company. The new section starts with a membership of 35 and the following officers, who were elected this evening: Chairman, Geo. H. Jones; vice-chairman, G. H. Atkin; secretary, J. W. McDowell; and executive committee of C. C. Murphy and L. E. Burr.

W. H. Blood, Jr., president of the Electric Vehicle Association of America, addressed the organization meeting on the scope of his association, and Louis A. Ferguson of the Chicago Commonwealth-Edison company spoke on the electric vehicle in the Windy City. The most important feature in Mr. Ferguson's address was the announcement of a 20 per cent. reduction in the cost of current or charging as furnished by his company. In announcing the new rates Mr. Ferguson said:

> We are prepared to announce a new off-peak schedule especially applicable to electric vehicle charging, being a very material reduction from our present rates, and should prove of great benefit in extending the use of the electric vehicle in this community
>
> While it is true that of the total cost of operating a commercial electric truck the cost of electricity is very small, being under 8 per cent, yet, as the monthly bills come in with machine-like regularity, the item of electric power gets a wrong perspective, so that this item, which really is one of the small factors in the total cost, takes an undue prominence. In order to improve this condition as much as possible we are about to put into effect an off peak schedule effecting installations of a monthly maximum demand of 50 kilowatts or over The off-peak features are that no charging be done between 4:00 P. M. and 8:00 P. M. during the months of October, November, December, January, February and March. Under these conditions of operation the price for electric energy is greatly reduced. In order to give you an idea of what this means, I have prepared a few figures, as follows:

NEW OFF-PEAK RATES.

	K. W. H. Consumption a Month.	Direct Current.	Alternating Current.
50 K. W. maximum	15,000 K. W. H.	.024	.0222
75 K. W. maximum	22,500 K. W. H.	.0211	.0188
100 K. W. maximum	30,000 K. W. H.	.0196	.0172

> These figures represent a reduction of about 20 per cent. from our present wholesale schedules.
>
> One significant thing about the matter of cost of electric energy is that rates have been reduced greatly during the last few years, whereas the cost of keeping horses during this same period has increased greatly. As a matter of fact, during the last 5 years oats have increased in price almost 30 per cent; horses, 40 to 50, and hay about 100 per cent.

Speaking of the possibilities of the electric vehicle in Chicago, Mr. Ferguson said further, "Chicago streets are very level and due to the many widely separated railroad terminals and markets there is probably more teaming per capita than in any other American city." The following are some facts relative to Chicago and the electric vehicle industry:

Number of pleasure electrics in Chicago..........	2,000
Number of commercial electrics	250
Number of commercial electrics probably sold in 1912..........	200
Total number miles streets	2,978
Number miles of paved streets (of which 1,200 miles in very good condition)	1,652
Number of miles additional streets paved between railroad terminals	100
Total miles good usable streets..........	1,300
Average of 100 miles of streets paved during each of past 5 years, and during the coming 2 years there will be probably..........	250

Cost of maintaining 2000-pound commercial electric wagon, running 10,000 miles a year, divided up about as follows:

	Cost a Mile.	Per Cent. of Total.
General Expenses:		
Supervision, garage rent, wheel tax and State license..	$0.018	12.2
Operating expenses:		
Fixed charges (interest, depreciation, taxes and insurance)	.04	27.10
Tires	.025	16.9
Washing and minor repairs..........	.024	16.26
Battery renewals	.019	12.90
General repairs	.011	7 44
Electricity (new rate)	.0106	7.2
Total cost a mile, exclusive of driver..........	$0.1476	100

> Our company believes that best results will be secured in fairly large garages, which can afford to have competent men and better facilities.

In speaking of the general possibilities of the motor truck, and particularly on the field for the electric vehicle, President Blood said:

> "Electric commercial wagons are being sold and used in fleets. The Adams Express Company operates 250; the Ward Bread Company, 230; New York Edison, 100; American Express Company, 86; Gimbel Bros., 76; Jacob Ehret, 63; Peter Dolger Brewing Company, 57; Ward-Corby, 65; United States Government, 52, and Chicago Commonwealth-Edison Company over 50.
>
> "The necessity for the motor vehicle was well demonstrated during the hot wave last July when 3,752 horses died of exhaustion in the four cities of Chicago, New York, Philadelphia and Boston. This represented a profit of loss of $1,000,000.
>
> "The enormous field of the electric vehicle is well shown by the fact that 25,000 tons of freight, on an average, are handled every day in the year on the streets of Boston. The amount handled by wagons throughout the country is 10 times greater than that handled by all of the railroads put together. Nearly 3,000,000 motor vehicles will be needed when this work is done without the horse.
>
> "The Electric Vehicle Association of America is aiding and developing the industry. Two leading makers of electric vehicles told me within the past month of enormous increases in business. With one its business was 282 per cent greater in January, 1912, than in January, 1911. The other company had an increase of 80 per cent. for January, February and March, 1912, as compared with these months in 1911."

Boston Aiding Electric Vehicles

The work that is being done by the Boston Edison company in aiding the manufacturers and dealers in electric vehicles in pushing their product is worthy of imitation in other cities.

As previously stated in this department this company has expended $40,000 in varied means of advertising the electric, and has pledged itself to spend over $300,000 more in the general development of the industry. In addition to the establishment of its garage, the company aids the industry in other ways. It maintains an electrical engineer in the charge of its automobile division and has offered to send skilled men to any portion of its territory which extends from the Rhode Island line to New Hampshire to have these men test any machine free of charge.

In response to criticisms on the cost of charging of electric vehicles in private garages the company has given out the following figures showing the charging bills of the month of April for various machines:

$2.20	$4.70	$10.00
2.50	5.90	10.50
3.50	6.40	11.40
3.70	6.60	14.30
4.10	7.00	**22.05
4.10	8.60	22.77
4.20	9.00	*23.06
4.40	9.62	*23.17

Average for 24 cars = $9.32

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*Physicians' cars.
**Used for commercial purposes.

Wants Lower Charging Rates

J. W. Brown of the Couple-Gear company has written the COMMERCIAL VEHICLE on what he considers too high rates for charging of electric vehicles. Mr. Brown considers that this is holding back the electric industry in certain sections. He has expressed himself as follows on this question:

"The only factor that seems to influence or hold back the purchase of the battery-driven commercial wagon is the non-desire on the part of the Central Station people to give reasonable rates for charging storage batteries. These conditions are becoming better, as the Central Station owners are beginning to realize the fact that when we sell a commercial vehicle which will require their electric current we are boosting their business and giving them a customer who is worth good money. Many of the Central Stations are showing a willingness to give such customers a reasonable rate for the off-peak delivery. This feeling has recently developed very much in the East.

"In the smaller cities the Central Station people are slow to realize that they should act similarly, but without doubt the time will come when Central Stations generating current from water power will make a flat rate of 2.5 cents to owners of commercial vehicles and at the same time have a good profit and aid materially in developing the industry."

Notes on Electric Vehicle Filed

Many concerns that have been operating electric vehicles for several seasons have of late been keeping definite accounts of their performance and operation, and a few examples of these are given herewith:

The John Taylor Dry Goods Company, Kansas City, Mo., using electrics for delivery purposes get from 23 to 27 miles a battery charge on an average and frequently as high as 45. The load capacity is 1000 pounds, but this limit is rarely reached because of the lightness of department store merchandise. These vehicles have been in service 6 days a week since the installation last October. The incidental upkeep of a car averages from $5 to $10 a month. The cost of battery charging for the 6 in January was $122 and for February $108. The difference for these 2 months was due to weather conditions. The electrics are used on delivery routes where good street conditions prevail and also on the close-end territories, the outlying districts being served by gasoline machines.

The Evening News Association, Detroit, uses three 1.5-ton electrics, four 1-ton wagons and a 1.5-ton truck. These vehicles are used for newspaper delivery work. The daily mileage approximates 45, although in emergencies 90 miles has been made on a single charge of the Edison battery. The News Association states that it has not found any shortcomings in the application of electrics to newspaper work. Seldom if ever has any delay in delivery been caused.

The Motor Delivery Company, New York, operating General Vehicle electrics in mail delivery service in which an exacting schedule is required operates these vehicles at a speed of 12 miles an hour, giving service 24 hours a day and 365 days in a year. C. H. Hardwell, president of the company, has given the following cost of operation for these vehicles:

No.	Capacity.	Miles.	Repairs, Including Painting.	Tires.	Batteries.
17	1,000 lb.	216,046	$4,712.60	$2,456.72	
5	2,000 lb.	71,345	1,185.97	1,233.07	$8,943.22
4	4,000 lb.	36,155	739.98	906.42	845.80
2	7,000 lb.	7,456	92.17	389.58	477.55
Total		331,002	$6,730.72	$4,985.79	$10,266.57

This shows for 28 machines over 331,000 miles at a total expense of $21,981, or a cost of a little over 6 cents a mile.

Many Electrics Sold in Bay State

Due to the motor truck show early in the spring and the continued activity of the electric interests, more trucks have been sold in and around Boston in the past 2 months than in the previous 6, a large percentage of these being electrics. In the first 4 months the commercial vehicles registered in Massachusetts exceeded the entire year 1911 by 25 per cent.

RAINPROOFING
TRUCK No 3
IMPROVED.CLOTH SPONGING WORKS
BOTH PHONES 1265-67 W. 2ND ST.
THE ONLY GENUINE LONDON WATER SHRINKERS

Baker Electric Vehicle in Cleveland Service for Six Months

Light delivery wagon which went into service during zero weather with much snow on the ground, yet did not miss a trip. During the 6 months it has been in use no repairs of any description have been needed. It is operated by an inexperienced man. In the worst weather, it made 70 miles on a charge, but seldom does more than 35 to 40 miles during a regular working day.

Present Truck Trade Conditions

What Is the Condition of the Commercial Vehicle Business All Over the Country, and What Are the Prospects for the Immediate Future?

EVERY manufacturer, agent and dealer in the country wants to know how the others are doing and what their opinion of the present and future situations is. To answer this need, the COMMERCIAL VEHICLE has made inquiry among the men in the trade, including the makers, and in the various cities of the country. Much of this information is confidential in that a definite firm name may not be attached to it, but this makes it none the less valuable.

Manufacturers generally agree that business between April 15 and May 15 has been much better than a year ago in the same period. With but three exceptions, all makers report about the same, namely, very good or very brisk. These exceptions may be given as follows: One maker reported that, due to the wet weather and very late spring, April was not a good month, but that the first two weeks of May almost made up for it. Another said although the past month has shown a falling off in the business done among the small merchants, it is improving steadily and rapidly. The third unfavorable one stated that the situation, although not of the brightest, was improving rapidly; that few orders had been received, but much missionary work had been done upon which the firm expected to collect very shortly.

Perhaps the general tone of the favorable answers would be expressed best in their exact language. One maker stated that business has been unusually good, especially in the line of fire and municipal apparatus. Another said that it was coming so fast that the year's production figures had been revised and increased 50 per cent. Still another noted the fact that during this period the largest number of new dealers had been added. The most favorable of all calls this the best period the firm has ever experienced, with sales much larger than had been expected.

Considering the possible customers, it would appear as if there was much difference of opinion here, one firm finding that a certain industry took the greatest number of its cars, while the next one gave that same industry as taking the least number. In general, of all the replies received the following gives the numerical strength of the industries reported as the best customers during the month:

Name of Industry.	Per Cent of Firms Reporting This as Best.
Brewers and Bottlers	21
General trucking and teaming	16
Furniture	10
Grocers	10
Moving and storage	10
Jobbers	9
Lumber	6
Coal and ice	5
Wholesalers	5
Millers (flour)	5
Laundries	4

In the matter of comparing this year's business with that of a year ago, the real conditions were brought out by the definite percentages given. It seems incredible, but is a fact nevertheless, that all the firms reporting a definite figure averaged 145.5 per cent. increase over the same period of last year. The highest was 600 per cent., which, it must be explained, came from a firm which had done very little at this time last year, but is now meeting with an unprecedented demand. The lowest given was 48 per cent. In the line of specialized work one maker stated that business in motor trucks had increased but 59 per cent., while fire apparatus had increased 100 per cent.

Not the least interesting were the excuses given for not purchasing or objections raised to the commercial vehicles. According to numbers, more firms fail to buy on the score of high operating cost than for any other reason, this being followed very closely by initial cost and the lack of ready money which could be used for this purpose. Many business men and houses intend to purchase cars when their present horse equipment proves inadequate, when the horses die or become incapacitated or when they can realize on their present investment or see their way clear to scrap it.

Other objections raised by many firms are: Objection to anything new; bad roads in both country and city suburbs; past bad experience of friends or acquaintances with motor trucks; lack of loading and unloading facilities; lack of knowledge of horse cost, making it impossible to show a saving; doubts about the ability of commercial vehicles to stand up continuously and do the work regularly, and many others.

On the section of country which has given and is giving the best results there seemed to be better agreement than on any other point. Approximately half the makers agreed upon the East, the large cities of the East or New England, one quarter partly included in the above stating that next in order the Pacific Coast was the best section in which to do business. Only 30 per cent. considered the Middle West as the best section, this part of the country being put down generally as hard to interest, slow to buy, etc. As to the South, it seems to be the consensus of opinion that while a little business is being done there the bad roads are holding it back. One firm fancied a strip of country from ocean to ocean, north of Mason and Dixon's line, as the best territory.

Referring again to the larger cities absorbing many cars, it was of interest to note the general attitude toward the places having less than 50,000 population, as well as the small towns. Generally speaking, the makers agree that the cities of less than 50,000 are improving as a truck market very rapidly. Those opposing this view were small in number and included a few opinions like this: The road conditions count more than the actual number of people. A large city with poor pavements is a poorer market than a smaller one with excellent roads, and a better and more permanent business can be done in the latter case.

The general tendency toward betterment is noticeable, too, among the smaller makers, many of whom are known to have increased their prospective output for 1912 on the basis of what business has been done to date and is in sight. The newly started firms, too, seem to get sufficient encouragement from them to hasten production, a number of these having announced within the last 30 days their intention of producing vehicles steadily from now on, with a definite factory output.

From the various cities, too, the good reports continue to pour in. Bridgeport, Conn., reports 26 per cent. more business than in 1911, Danbury 18 and South Norwalk 12 per cent. In Springfield, Mass., one small firm has sold nearly 20 trucks since September, while another has disposed of five 5-ton vehicles since February first. In Boston much business is being done in the medium sizes, Packard, Peerless, Mack, Knox and other standard makes selling well, while the smaller cars like Ford, Reo and Buick are also selling in large numbers. The electric continues to loom up large, due to the activity of central station companies.

Philadelphia shows a 40 per cent. increase in amount of business done and number of cars in use, while Washington is not far behind with an increment of nearly 25 per cent. Prospects in Baltimore are excellent and the dealers are well pleased. In Syracuse the Packard dealer reports a fine business during April, while the factories of that city are unitedly favorable. In York, Pa., more trucks have been sold during the few months of 1912 than ever before, the cars in the city having doubled in number.

Ohio is a good state, although most of the business is done in Cleveland, Cincinnati and Columbus. Toledo is noted as not much of a truck field, although the business done exceeded that of a year ago. One firm sold seven trucks within 30 days. In Findlay prospects are good, but are mostly prospects. Three recent sales have been to department or furniture stores.

Detroit does most of the business for the state of Michigan, but from Grand Rapids comes the statement that a very large business, much larger than last year, is being done in light delivery wagons, although few heavy trucks are sold.

Many sales were recorded in Indianapolis, but few outside of the city. In Richmond, Va., sales have been small thus far. New Orleans, on the other hand, chronicles the greatest amount of business ever done, an increase of more than 70 per cent. over 1911. Of the 25 trucks sold during April all but four have been to department stores. The outlook for the summer, however, is poor, due to business depression.

In Kentucky conditions are favorable and one dealer has a record of 20 per cent. increase over 1911. All dealers look for a good summer. Austin, Tex., has a record of more truck sales during the past five months than in the five previous years. San Antonio also shows a big increase, although the weather has held sales back. Phoenix, Ariz., reports more trucks sold since the first of the year than during its entire previous history.

Due to bad weather and climatic conditions, Wisconsin has not much to offer. In Milwaukee few demonstrations have been made and but a few sales. In Iowa, on the other hand, a tremendous increase in the number of trucks in use has taken place. Dealers estimate that nearly 200 have been sold this spring. One concern alone, the Velie company, has placed 24 trucks in the tri-cities of Davenport, Rock Island and Burlington.

In St. Louis business is good and the outlook for the summer bright, but none of the dealers report any large sales. Minneapolis has good business, too, one firm having a 20 per cent. increase to show. In Kansas City the hills have opposed truck buying, but the larger sizes are taking well, three Pierce Arrow trucks having been sold to a local sand company. One of the brewers has just bought three additional electrics.

Denver ranks with the others in being well satisfied, the figure for the increase there showing 300 per cent. as compared with last season. In Winnipeg, Can., many repeat orders are making a nice little business, while other orders are numerous.

Much Activity Among Western Manufacturers

CLINTONVILLE, WIS., May 22—The Four Wheel Drive Automobile Company, of Clintonville, Wis., which is building commercial and pleasure cars embodying the Zachow-Besserdich four-wheel drive principle, has entered upon the first actual era of business and now finds it necessary to enlarge its work greatly and extend its activities. There has been some talk of moving to another city to gain better railroad facilities and labor conditions which are not possible in a city of the size and location of Clintonville. Appleton, Wis., a city of 22,000, seems to have the best show for becoming the new location.

The high recommendation given the Four-Wheel Drive car by the War Department as the result of its recent test run from Washington to Indianapolis has given the new car a national reputation. The department has already ordered two more cars, a 1.5 and a 3-ton truck, which will be used for further tests.

CROXTON TO BUILD IN PITTSBURGH

PITTSBURGH, May 24.—Plans for a $100,000 automobile manufacturing plant have been finished and bids are being taken, the site to be in Washington, in this district. The plant will be erected for the Croxton Motor Company, of Cleveland, exclusive makers of taxicabs, the firm coming to this district because of the nearness of the raw material and the advantages of distribution. The plant will be of steel and concrete on a lot 120 by 150, as well as a boiler house on a lot 30 by 40 feet.

UNIVERSAL TO GO TO MILWAUKEE

MILWAUKEE, May 21—It is stated on excellent authority that the Universal Motor Truck Company, of Detroit, has arranged to move its big works to Milwaukee by July 1, 1912.

The removal is said to be the result of the efforts of the big interests controlling the Joseph Schlitz Brewing Company, of Milwaukee, who are also interested heavily in the Universal company and other companies of which Walter E. Flanders is the active head. The decision to move followed the recent merger of the Flanders interests with the Metzger Motor Car Company, of Detroit.

The Universal company is capitalized at $1,000,000, and will employ from 2,000 to 2,500 men. Nothing definite is known as to the exact location of the works in Milwaukee.

BRODESSER REORGANIZED AND ENLARGED

MILWAUKEE, May 25—The Brodesser Motor Truck Company, of Juneau, Wis., formerly of Milwaukee, has been reorganized and the management is now in new hands. The name of the corporation has been changed to Juno Motor Truck Company, the word Juno being the phonetic name of the city in which the works are located.

The new officers are: President, L. C. Pautsch; vice-president, William MacDougall; secretary, Henry Henning; treasurer, T. J. Hemmy. Mr. MacDougall will also act as sales manager. He was for many years associated with the Kissel Kar Company, of Milwaukee, as assistant sales manager. The company manufactures commercial vehicles in 1.5, 2 and 3-ton sizes and on May 1 had ready for shipment 40 trucks.

GRAMM NOT IN NEW TRUCK COMPANY

LIMA, O., May 20—B. A. Gramm of this city, vice-president of the Gramm Motor Truck Company of this city, denies emphatically the rumor that he is interested in a new company forming here for the purpose of manufacturing commercial vehicles. Mr. Gramm said that the report was without foundation and that he was not interested in any other company than the one of which he is vice-president and a director. He does expect, however, to give himself a much needed vacation this summer. He denied all knowledge of the lease of the American Strawboard buildings mentioned in connection with the rumor.

The Motor Truck in Grocery Delivery

(*Continued from page* 11.)

BUT the use of the motor truck is not confined to the large dealer nor to long runs. F. R. Otto, 5351 S. Halsted street, 7 miles from the loop, has used a 1,000-pound International for 1 year, taking the place of a single horse and wagon. He makes 100 deliveries, in only 10 miles of actual travel, in six separate trips, to and from the store, and in addition he makes the run to S. Water street, a distance of 8 miles, twice a week, before opening the store.

How Drivers Are Trained

In respect to drivers, most users train their experienced delivery men to drive their cars, as they find that good delivery men are more scarce than good mechanics, and as simple and fool-proof as motor trucks are made today, they are easily within the range of comprehension of any bright boy. A 13-year old boy drives Moore's machine. Mr. Otto drives his own car, soliciting orders at the same time, thus keeping in close touch with his customers and making sure of his helper's industry. Another dealer, when asked if he had any difficulty in getting his chauffeur to do odd jobs, pointed to the window, where the boy in question was seen industriously washing it. Small trucks do not require two men to operate them, although better efficiency is to be had if two are used, in all but the smallest stores. The experiences of C. H. Morgan and Stone Bros. is to this effect, as they find, as do all of the large department stores, that with two men on each vehicle, whether it be horse-drawn or motor-propelled, less time is consumed in stops, starts, turning around, and in loading. With one man always driving, the other may give his undivided attention to the selection, routing, and delivery of parcels, and can alight and board the vehicle while it is still in motion. The driver on the other hand, can make all turns, etc., during stops, and in the case of the motor car, need not shut down the motor as the city ordinance requires of unattended motor vehicles. He also can pull ahead to the next stop, where they are close together, and hand the next package to the delivery man without the necessity of the latter mounting the vehicle. The chances of theft are also greatly reduced when the wagon is never left alone. Chauffeurs need not be paid so much, when provided with an assistant, as otherwise, while boys for delivery may be hired very cheaply.

In respect to the type of vehicle best adapted to the various needs of grocers, the smaller car of about 1,000 pounds capacity is best adapted to local delivery on short to medium runs, and for all-around service of the smaller dealers. The medium sizes are not apt to give satisfaction to the man who does not do a very large business, *i. e.*, a business large enough to require loads of over 1 ton as a rule, rather than an exception. As an auxiliary to a fleet of smaller cars they are best adapted, or as special delivery cars for wholesale firms. The larger trucks of from 3-ton capacity up, are well adapted to the wholesale trade, but are too heavy for retail service.

Questions to Solve and Summary

The question for the retail grocer to solve in regard to the motor truck is no longer, can he afford to modernize his delivery equipment, but can he afford not to? Setting aside all considerations of the increased patronage that many dealers enjoy as a result of quicker, cleaner, and a wider range of delivery, the time has come for the modern grocer to look farther than the first cost before condemning that which is new. No manufacturer of motor trucks, on the other hand, can afford to overlook the grocery field as a market for his wares.

No grocer who does any delivering at all can afford to overlook the following points of superiority of the motor wagon over the horse:

1.—Improvement of the quality of the goods handled, due to the cutting out of the peddler's profit, or the teamster's fee.

2.—Better service to customers.

3.—Wider range of delivery, hence more opportunity for business expansion.

4.—More uniform service, not affected by weather.

5.—Less time of vehicle and operative wasted in unproductive return trips.

6.—Increase of efficiency of operatives.

7.—Prompt deliveries.

8.—Actual economy in service.

9.—And finally any merely geographical condition that causes independent dealers to depend upon mere parasites of commerce, such as wholesale peddlers unquestionably are, for their supply of fresh produce, sacrificing their right to trade in an open competitive market, is a restriction on efficient merchandising. The effect of adding to the number of middlemen is to add complication to an already over-complicated system of commerce, to increase the expense of selling and the number of changes of ownership through which the goods must pass on their way from producer to consumer, and to add to the difference between the original cost and selling price, and can have no other effect than an increased cost to the consumer, therefore increased cost of living, and inevitably decreased revenue to producer, wholesaler, and retailer.

Thus, the restoration of a truly competitive wholesale produce market, and a consequent increase of prosperity for all concerned, and a corresponding improvement in the quality of the goods as a result of quicker handling, along with the improvement of retail delivery service, economy of cost, and the saving of time, constitute the most important missions of the motor truck in the grocery field.

BOSTON TO PURCHASE MOTOR APPARATUS

Boston, May 16—Acting upon the urgent request of the Mayor and the Fire Commissioner expressed some weeks ago, the Boston City Council tonight passed an order appropriating $42,000 for the purchase of motor apparatus for the fire department. It is the intention of the Fire Commissioner to use this money for the purchase of 13 motor vehicles. Seven will be cars for district chiefs of the department at an estimated cost of $1,800 each; three will be combination hose and chemical wagons at an estimated cost of $5,500 each and three will be combination chemical and ladder trucks at an estimated cost of $6,300 each. With the seven cars for the district chiefs every district head in the city will be supplied with a motor wagon for his own use, as a number of the district chiefs already have automobiles. The combination hose and chemical wagons are to be placed in suburban residential districts in Dorchester and Hyde Park. The combination chemical and ladder trucks are also destined for suburban service in Allston, Dorchester and West Roxbury. The question of additional motor apparatus has been hanging fire for a long time. The Finance Commission recommended the motorization of the fire department a long time ago and the Mayor has supported the plan but up to now it has been impossible to get the appropriation through the Council.

Newest Thoughts from Leaders in the Industry

PROGRESS OF THE MOTOR TRUCK

By John N. Willys, President Gramm Motor Truck Company and Overland Automobile Company.

MOTOR truck usage has grown with such tremendous leaps and bounds during the past 2 years that one can hardly keep pace with the onward march of the power-driven vehicle.

While the progress of the motor truck was slower than the pleasure car, its inevitable economic saving was apparent to even the most skeptical business man. Probably the predominating feature which caused the merchant "to be shown" was the question of durability and stability in withstanding hard usage.

In the early days of power delivery the electric held undisputed sway, many 4, 5 and 6-ton machines being employed. The pioneers soon found that truck service was not without its drawbacks, and many a shrewd business man was wont to admit that he had made a mistake in adopting them. However, these same men were of the kind whose lives are made up of overcoming difficulties, and it went sorely against the grain to acknowledge defeat. This resulted in a continuance, although in many cases at a decided loss, in the use of the early types of motor truck.

Gradually experience pointed the way to more economical service; and in the meantime the truck makers were advancing rapidly in the knowledge of more reliable constructions and in truck requirements. The opposition of horse drivers became less damaging and the more progressive realized that better prospects awaited them by learning to handle this new form of delivery wagon.

As the number of machines in service increased, the police and traffic authorities began to recognize that there was less congestion, and soon invariably gave preference to the motor-driven vehicle, knowing full well that it could quickly and accurately extricate itself from the most difficult tie-up, thereby immediately relieving the situation.

It is a significant fact that while, until very recently, commercial motor cars were mainly to be found upon the streets of the great cities, they have lately appeared in sufficient numbers in the smaller cities and towns of the country at large to indicate that the business men and manufacturers of the nation are beginning to take a more than passive interest and are becoming earnestly concerned in a revolution of transportation methods. One by one the more progressive merchants have investigated this new method of delivering goods, and where honest investigation is made there is no room for skepticism. The horse must give way to the power-driven car.

To-day the commercial motor vehicle as a means of conducting the delivery branch of any business is no longer an experiment. It has been tried and not found wanting. It is a reality, and the future outlook for it is exceptionally bright. Having proven its necessity, its great advertising value to the merchant, the change of feeling toward the motor-propelled truck and delivery wagon has been steadily growing, and the time is ripe for its universal adoption. There is no question that the motor truck has arrived, that it will more than do the work required of it and will do it more swiftly, more reliably and cheaper than the horse.

RELATIVE ECONOMY—TRUCKS AND HORSES

By A. R. Warner, Secretary, The White Company.

IT is a safe assertion that at this time no old established department of any business is undergoing such a metamorphosis as the delivery or local transportation department. Like all unproductive departments, it has been looked upon as a necessary evil, but until the recent introduction of motor service, there has been no alternative to the horse.

While a few of the larger automobile concerns had for years been experimenting with trucks, it was not until the business depression of 1909 resulted in an apparent probable decrease in the demand for pleasure vehicles (which to the surprise of the entire business world did not develop during the following spring), that a few of them began making their plans to place on the market the trucks they had developed.

In a general way it may be stated that three points are to be considered in contemplating changing a delivery system from horse drawn to motor drawn: Relative economy, extension and betterment of service, and advertising value.

First and most important is the relative economy. The conditions under which a motor truck shows the most economy as compared with horse delivery is, as nearly as possible, continuous operation with a continuous load. There are undoubtedly conditions where horse delivery is more economical than motor truck delivery—when hauls are short, stops are frequent, loads are light or varied and waits are long. Under such conditions the superior speed, endurance and carrying capacity of the truck are more than counterbalanced by its greater cost and larger operating expense.

Almost universally the introduction of motor trucks results in a reorganization of the entire delivery system, in a more strict supervision of the drivers and helpers, closer adherence to schedules and better methods of loading and unloading.

The second point to be considered in contemplating a change in delivery systems is the extension and improvement in service that can be given by the use of motor trucks, which naturally results in an extension of business. If economy and extension of service, resulting in an increase of business, can both be obtained, the arguments in favor of motor delivery are, of course, increased, but if economy cannot be effected it then becomes a matter of judgment as to whether the additional business to be obtained through the extended service would warrant the use of motor delivery.

The third point to be considered in the introduction of motor truck delivery service is its advertising value. I must admit that I believe that within a few years a horse-drawn truck or delivery wagon will be more of a novelty on our city streets than a motor truck or delivery wagon, but when that time comes the owner of horse-drawn vehicles will be most undesirably advertising his unprogressiveness, providing his business is of a nature to admit of the use of motor delivery and his competitors are using the up-to-date method.

The initial investment in truck equipment is necessarily a large one, but when it is made, it is over and done with, but the daily operating and maintenance expense continues and cannot be avoided. For this reason, the matters of gasoline and oil consumption, the little details which may affect tire mileage, such as the distribution of load, the size of tires, etc., cannot be too carefully considered.

Cost of Operating Commercial Vehicles

What It Costs to Use a Motor Truck in Different Lines of Business, Bringing Out the Splendid Economy of Both Time and Money—Police Patrol Saves $700 a Year—Economy in Telephone Work—Department Stores

IN the cost of operating a gasoline patrol wagon in the police department service of Wilmington, as compared with the cost of maintaining a similar horse service, an interesting guide for other cities of a similar size, namely, 100,000 or thereabouts, is gained.

This city has adopted the motor very recently, but has had good results with it from the outset. The patrol is a 45 horsepower Pierce-Arrow designed to carry 12 passengers. It is equipped with Republic tires of 36 by 4-inch section in front and 36 by 5 in the rear. The streets of Wilmington over which it operates are paved with various materials, including bitulithic, asphalt, brick, Belgian block, rubble, macadam and a very few not paved. Most of the pavements are in fairly good condition, even though worn. As a whole, they might be considered as hard on cars and tires. According to the departmental records, the car covers an average of about 75 miles a week, or at the rate of nearly 4000 miles a year, although in the month of January it did but 212 miles, or at the rate of about 50 a week.

The cost report shows that for the 6 months the machine has been in operation, it has averaged $54.33 a month as compared with $110 for the previous horse outfit, thus indicating a monthly saving of $55.67. On this basis, the entire original investment in car and garage will be saved within 4 years of the purchase.

The complete cost statement as taken from the department books is:

Cost of Operation for 6 Months

Patrol cost	$2,450.00
Extra equipment carried on car.	
2 extra tires	105.05
4 extra inner tubes	34.05
2 tire covers	8.00
1 set tire chains	10.50
1 Klaxon horn	31.33
6 extra spark plugs	6.00
Total	$194 93
Car ready for service cost	$2,644.93
Gasoline bought since Aug. 8	$60.90
Lubricating oil	8.13
Grease	2.00
Tire replacements and repairs	138.31
Supplies and sundries	37.74
Cost of operation, upkeep and maintenance	$247.08
Board for four horses a month	$80.00
Rent for patrol station a month	15.00
Horse shoeing, medicines, upkeep on wagons and harness, estimated, a month	15.00
Cost a month	$110.00
Motor car cost	$2,644.93
Garage cost	1,000.00
Total investment	$3,644.93
Amount realized on horse outfit	1,014.22
Increased investment	$2,630.21
Interest on increased investment a month	$13.15
Upkeep a month on motor car	41.18
Total cost a month for motor car	$54.33
Cost a month for horse outfit	$110.00
Cost a month for motor car	54.33
Amount saved a month over horse outfit	$55.67
Amount saved to City for time motor car has been in service	$334.02

Wilmington's Patrol Coming Out of the Municipal Garage

During January the patrol covered 212 miles, in a total of 144 calls, hauling 173 prisoners, and, while there was nothing on the wagons to register their distance in January of last year, it has been figured that it was about the same, 212, though the calls were more numerous, numbering 172. A total of 215 prisoners was hauled by the wagons in January, 1911.

On this basis the city is paying 6.21 cents for each mile the auto patrol travels, in addition to the pay of the men, which does not figure in a comparative statement, while for each mile the horse-drawn wagons traveled the city paid 47.3 cents.

When the city used horse-drawn vehicles in the police service it was necessary to board the horses, as the department owns no stable, but when the horses were dispensed with a garage was built, at small cost—about $1,000—on city property, immediately in the rear of the police station, and now the only items entering into the maintenance cost are those given above.

The financial outlay—or first cost—did not show a very large difference. While the new patrol cost $2,700, two wagons, horses and harness cost $2,300, the difference being $400, which has been more than made up since the new machine was in service. The one motor car does the work of the four horses and two wagons which it replaced, and, according to Chief of Police George Black, does the work in a much more satisfactory manner, while the service is much quicker, an item that counts in a police service in a city with a population approximating 100,000 and an area of 10 square miles.

Due to local conditions, the three hospitals are not in a position to maintain ambulances. For this reason, the city pays one of the fire companies, the Phoenix Fire Company, $1,400 a year to maintain the service. Having a municipal garage, it is now planned to purchase a combination patrol and ambulance. As the present vehicle, shown in the accompanying illustration, is convertible this would give the city the equivalent of two patrols and two ambulances with the initial cost and upkeep expense of but one of each. On the basis of the cost of the present machine, another would amount to but $652 a year, thus saving $748 a year over the present ambulance arrangement.

Saving in Telephone Business

Only a few months ago a prominent telephone company had an experience with a motor truck which, aside from showing its value in an emergency, brought out a saving of something over $20 in parts of 2 days, totaling, however, less than 24 hours. At this rate, could the vehicle be used similarly the year round, about $6,500 a year would be saved.

The truck was a 1.5-ton Mack owned by the Bell Telephone Company of Philadelphia. The strand supporting two cables at Sellersville, Bucks County, Pa., burned and allowed both to fall. It was of vital importance to deliver the repair men and cables at this point with a minimum of delay. The truck left at 5 in the afternoon for the cable storage plant with a load of tools and small material, and hauling a pair of cable wheels. Upon the latter a reel of 1500 feet of one size cable was loaded, while 800 feet of another was put in the truck body. Pulling the former as a trailer the truck left at 7 that night, arriving at Sellersville at 1 the next morning. Leaving the men and materials, it returned immediately to Philadelphia, where it arrived at 6 that morning. This made the out trip, during the night and with the load and trailer, in 6 hours and the return, light, and partly by daylight, in 5 hours, less the unloading time.

The total weight hauled was 5455 pounds, including tools, cable and reels but not men. Shipped by express the cost would have been $27.28, while by freight it would have been, including hauling at both ends, with consequent delays, $17.39. The cost of this size motor truck is figured by the telephone company at $7 a day, total. The itemized saving was then:

By express, 5455 pounds at 50 cents a 100		$27.28
By freight, same at 13 cents a 100	$7.09	
Hauling in Philadelphia	5.30	
Hauling in Sellersville	5.00	
Total cost hauling by freight		17.39
Total cost by 1.5-ton Mack truck		7.00
Saving by motor truck over express......74.3 per cent, or		$20.28
Saving by motor over freight and teaming......59.7 per cent, or		$10.39
On the former basis, the yearly saving for 365 days would be		$7,402
for only 310 days		$6,286
On the latter basis, the amount saved yearly would be, 365 days		$3,792
310 days		$3,220

The Line-Up of Cars Owned by the Marott Department Store, Indianapolis, for the Operation of Which the Cost Figures Are Given Herewith

'Buses in Department Store Work

The Marott Department Store, Indianapolis, some time last year found itself with less customers than it should have, and, casting about for a reason, discovered that its store location was some little distance from the business center. To remedy this as far as possible, three 'buses were purchased and put into service. These are of the Buick make, the driver being entirely enclosed. They make a decided appeal to the buying public and have been of value as an advertising medium.

Their popularity may be noted in the figures for a single month, given herewith. In this it is shown that they traveled a distance of but 3213 miles and handled 42,889 passengers, an average of over 13 people a mile, or over 16 a trip. If each one of these persons spent an average of but $1 the profit would pay for all three 'buses.

The cars are on a regular Model 2-A Buick chassis, with metal bodies, finished in blue, with brass trimmings. The interior is upholstered in Spanish leather and has a natural wood finish. In addition to dome electric lights, electric signs on top call attention to the cars.

Beside the 'buses this store operates four Buick delivery wagons, with which the city is covered daily. Each one replaced three horses and wagons.

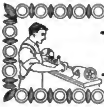
TYPICAL MONTHLY RECORD OF CARS

In Service.	Passengers Carried.	Pts. Oil.	Gallons Gasolene.	Miles.	Trips.	Driver.
Car 1—20 days ...	13,531	74	115	874	705	C. Kennedy.
" 2—24 days ...	14,323	90	111	1,111	855	J. Russell.
" 3—24 days ...	15,035	100	136	1,228	1,043	H. McGinnis.
Total coaches....	42,889	264	362	3,213	2,603	
Averages	14,296.3	88	120.7	1,071	867.7	

In Service.	Packages Carried.	Pts. Oil.	Gallons Gasolene.	Miles.	Driver.
Car 6—25 days	2,860	78	101	666	R. Johnson.
" 7—25 days	2,072	77	143	797	Geo. Maharry.
" 8—25 days	1,341	75	116	855	F. Rawlings.
" 9—20 days	1,831	116	108	800	W. Crosley.
Total delivery	8,113	346	468	3,118	
Averages	2,028.2	86.5	117	779.5	

Coaches start and stop 18 times to every mile. During the month not one call was made for help, not one single repair was made on any car; this record showing truck efficiency beyond any doubt, as these cars are not new, as can be seen by the following mileages: Car 1 has run 10,004 miles; 2, 10,754 miles; 3, 9,910 miles; 6, 13,417 miles; 7, 12,047 miles; 8, 8,389 miles, and 9, 9,889 miles.

The illustration above shows the cars owned by the Marott company, lined up in front of the store, 8 in number, although the figures cover only 7. The extra car is more recent.



Mechanical Notes for Truck Drivers

Adjusting the Spark Coil

CARELESSNESS with regard to the adjustment of the spark coil renders an efficient battery comparatively worthless. The tension of the vibrators on the spark coil should be adjusted to minimize the battery energy consumed without impairing the operation of the engine. The driver should see that the contacts on the coil are clean and even and not pitted. If he finds them pitted, they can be smoothed down with a fine file. Of course the spark plugs should be cleaned and the wiring put in good condition to secure the best results.

The driver should pull the crank slowly up until one of the spark coil units is thrown into position in the battery circuit and its vibrator is set in motion. He then should decrease the tension on the vibrator by turning the adjusting screw until the contact points are separated and the vibrator comes to a rest. Then he increases the tension by tightening the adjusting screw until the vibrator begins to operate. The best adjustment for the vibrator is determined by turning the screw backward and forward until the vibrator gives a strong buzz.

Each of the coils is adjusted in this manner and then the engine is started. If the engine does not run as it should further adjustments should be made on the vibrators by turning the adjusting screw backward and forward until the engine runs smoothly.

Guide for Taps on Flat Work

In tapping into a small or thin piece of metal for any purpose whatever, and particularly when the hole is small so that the tap is short, it is difficult to hold the latter straight. The result of this is that a crooked thread is cut, or if a straight one results the first few threads are badly mutilated due to the short tap wabbling around in the hole.

A plan which is often tried in this connection is the use of a nut with the same sized hole and the same number of threads an inch as the one to be tapped. This is placed on top of the piece to be tapped and directly over the hole. Then the tap is screwed through this until it begins to cut in the hole. Thereafter, until the whole threaded portion has worked through the nut, the latter prevents crooked work.

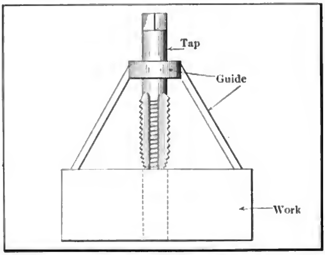


Fig. 1—Guide for Small Taps Which Insures a Straight and True Thread

An even better plan is outlined in the accompanying sketch, Fig. 1. This simple rigging takes advantage of the fact that nearly all small taps have the same sized shank, consequently this device can be used for a number of different ones. Thus, .25-inch 20 thread, .3125-inch 18 and .375-inch 16 taps vary, but .002 and .003 small and large respectively from the .25-inch shank. Thus, these three common sizes could be used with the same rigging.

It consists of a round collar or section of metal through which the central hole has been bored and a pair of legs or guides, two, three or four in number as desired. These may be soldered on or fastened to the collar in any easy manner. After attaching, the legs must be made of equal length or the device will be useless. This is done with a surface block, thickness piece and straight edge. The guide is placed on the surface block, and the perfectly flat or level surface of the upper part of the collar tested with the straight edge. If out, one or more of the legs is filed off to suit, after which the whole guide is turned through a small angle and tested again. After making it true in that position, it is turned again. In about the time it takes to tell it, the guide is corrected for all positions, and is then ready for use.

To use, the square end of the tap is pushed through the central hole, from below, and the outfit then set upon the surface of the nut or piece to be tapped. The device is pushed over until the lower end of the tap registers with the hole, when tapping can be started without any fear of a crooked or incorrectly-threaded hole resulting.

A machinist who has a great deal of this work to do could make a guide with a fairly large body, bore it out fairly big, and use a series of bushings for the various sized taps. For the whole range from 32 to 8 threads an inch, only a 1-inch hole would be required to accommodate the bushing for the largest size.

Switch in Wiring As Safety Lock

When it is necessary to leave the truck standing for any length of time and there is danger of someone tampering with the electric circuit or blowing the electric horn the little device described in the following paragraph will be found of great value.

A switch may be inserted in the wiring at some point easily accessible but concealed inside the battery box, if possible, as this will permit of the additional precaution of locking the battery box. There are various types of switches which may be used, but a snap switch is preferable, as it is not affected by the vibration.

To Prevent Formation of Rust

No other metals are in as common use as iron and steel, but the readiness with which these are attacked by moisture, with resultant rusting, is a serious defect. In order to prevent this on engines, moving parts are kept covered with a thin film of oil or grease. On the motor truck this is not always possible or desirable. Where rust is sure to form unless a preventative be used, a good one may be made by melting together beeswax and paraffin in equal proportions. When this has been reduced to a thin liquid, the parts are dipped in or painted with it. A very thin coating will suffice, does not rub off easily, does not soil the hands when they come in contact with it, and after it has hardened in place is fairly permanent.

Construction of Tire Valves

Very few chauffeurs and drivers, as well as shop mechanics and owners, understand the construction of the usual tire valve. This is the Schrader and is the same except for size on all tires. For the benefit of such drivers as have light commercial cars, taxicabs or other commercial vehicles with pneumatics, this will be explained.

The valve, shown closed and open in the two parts of the illustration, Fig. 2, has a straight body which terminates at the upper end in a reduced threaded portion. Inside, there are two straight parts, the lower, communicating with the interior of the tube, and the upper containing the valve. The upper portion of the latter is threaded. The valve has a lower part or seat, the mid-portion of which contains the packing that forms the actual air-tight seat. Above this is the threaded nut which forces the valve down into place.

The seat and nut both have large central holes, through which the central portion or plunger passes and in which it is a very loose fit. This is important, as the actual escape of air when the plunger is depressed is through this annular space around the plunger stem, the seat fitting tightly in the valve stem meanwhile.

To keep the plunger up, air pressure is not sufficient, and a spring is placed inside the valve which performs this office. A guide is useful for keeping it in place at all times. The plunger, it should be stated, is a loose fit in the bore of the stem. The air pressure within the tire has access to the spring and valve chamber, but can only press against the valve, for the latter is screwed down until the packing seat prevents any outflow of air, while the plunger is kept up tight against the lower end of the valve seat by its spring forming a second air-tight joint.

Air can get by the plunger, however, and does so as soon as the latter is depressed, making a place above it for the air to pass to. This depression of the stem, however, uncovers the lower end of the annular opening and lets the air escape.

When air leaks normally there are three sources of trouble, as the explanation above should have brought out; either the seat is not screwed down far enough, so the packing forms a tight joint, the packing is insufficient to form an air-tight joint, no matter how it is screwed down, or else the spring is not strong enough to hold the plunger up to its seat, allowing air to escape continuously through the annular opening. Any one of these troubles may be remedied readily, but the driver who goes far from his own and other garages always should carry a few extra valves, complete and ready to slip in place, also a special tool with which to screw them in.

Fixing Warped Valves Temporarily

No one thing will give the new truck driver more trouble or a more puzzling problem to solve than the warped valve. The best and quickest way to remedy it is to take the offending member out and put in a new one as quickly as possible. Usually, however, this is not possible and it will be necessary to run the car with the old one for a short time. To do that it must be fixed up. One way in which this may be done is to place it in a lathe and take off just as little metal from the face of the seated portion as will give a true surface. This repair is not permanent, as the cause of warping has not been removed, and it is likely to warp again in a short time.

A Water-Carrying Kink

Anyone who has had to carry a large amount of water for some distance will appreciate the following little hint, knowledge of which will make this mean job much easier. Since a pail of water is a heavy and awkward thing to carry at best, everyone tries to carry as much as possible each trip. The more nearly filled pail has a greater tendency to spill, both on the ground and on the person carrying it. This can be avoided by laying on the surface of the water a thin board or other similar stiff object, circular in shape and as near the diameter of the pail at the water level as possible.

A truck driver who carries a collapsible pail should take the trouble to have such a board cut to fit his pail, as its use on top of the water prevents spilling. When a very little water is wanted from the pail, as to wash the hands, it is very useful, too, because by simply pressing it the required amount of water is forced up around the outside. When it is necessary to pour from a pail covered in this manner, the board should be removed, and to facilitate this a handle or loop should be affixed to it.

Two Useful Additions to Equipment

Two things which often will be found of great service as additions to the tool box equipment, especially at this time of the year, when the roads are in poor condition, are a small ax or hatchet and a small piece of strong board. In case the truck becomes stuck in soft mud or gravel, as it is apt to do if heavily loaded, the ax may be used to cut boards to put under the wheels so that the latter may gain a tractive hold. The ax is often useful in many other ways, too numerous to mention. The small piece of board is of service when it is necessary to jack up a wheel on the road, as it furnishes a solid base on which to place the jack, no matter what the condition of the road.

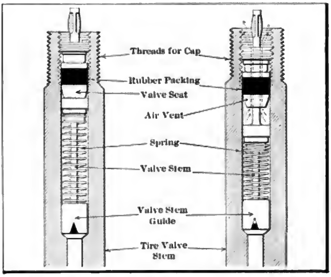


Fig. 2—Two Sections Through Pneumatic Tire Valves Showing Construction

An idea which is of value when the truck may have become mired or stuck in a mud hole is that it can be jumped out by bunching the tire chains or ropes, or other non-skidding devices carried, in a single spot on the wheel which is mired and then turning on the power. Ofter this will be successful in bringing the truck out at a single attempt, when applying the chains, ropes or non-skidding devices in the usual manner will not do a particle of good.

Often this scheme will work when the placing of boards under the wheels will not serve either. Its greatest value lies in the fact that it is less work than any other method, and at the same time is more effective.

Never Wet Ignition Apparatus

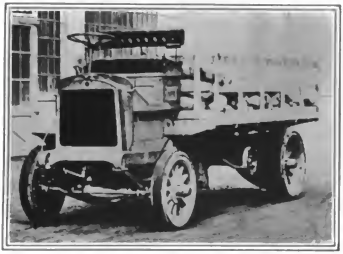
One thing that the new driver should have impressed upon his memory very firmly is that water is a good conductor of electricity and that, consequently, no part or parts of the ignition apparatus should ever be wet unless it is impossible to avoid it, and then they should be wiped dry afterward. If the car be washed with a hose and the magneto wetted it is liable to short circuit across the water inside and give about the same results as no magneto at all.

New Commercial Vehicles and Accessories

Details of Construction of the New Lozier 5-Ton Truck, Presenting Some Novel Ideas—The Palmer-Moore Three-Cylinder Two-Cycle Motor—A New Felloe Shaping Machine for Wheel Makers

FOLLOWING closely along standard lines and proven practice, with a few new ideas such as recent experience has shown advisable, the new Lozier 5-ton truck seems destined to take as high a place in the commercial world as the pleasure car occupies in its field. With a new and right up-to-the-minute shop in Detroit, this firm is prepared to concentrate on the latest product the whole of its energy and factory facilities, which cannot help but result in adding one to the number of high grade American heavy trucks.

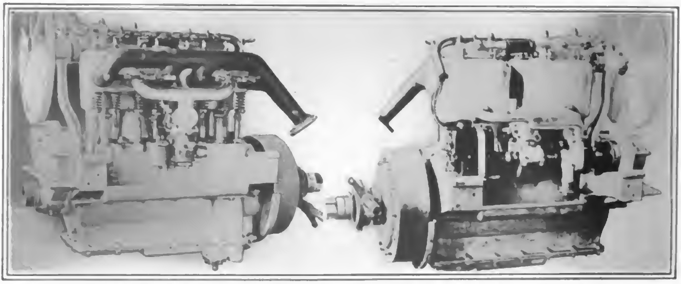
It is rightly called American, for that form is followed as distinguished from the so-called European, that is the driver is located above the motor rather than back of it. This firm favors that position on account of the superior weight distribution. It is said that with an exceedingly short wheelbase, it allows of a regular length of body space and gives the desirable division of the load, two-thirds to the rear and one-third to the front wheels. Additional advantages given for this are the position of the center of gravity of the whole vehicle forward of the rear axle (instead of directly over it) with resultant easy steering under any and all conditions of road surface.



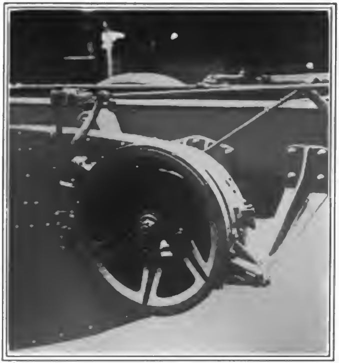
The Completed Lozier 5-Ton Truck Shown with Low Stake Platform Body and a Capacity Load

The argument of inaccessibility is met fairly by hinging the entire driver's cab at the rear so that a few simple connections may be opened and the framework thrown back. In addition, the entire power unit is mounted upon a subframe, this in turn being hung upon springs. This arrangement takes away all possibility of shock or heavy pounding on the motor due to more weight on the front wheels, while the removal of six bolts enables the driver to take out motor, radiator, clutch and other units in a very short time. It is said an extra power plant can be installed in 30 minutes. The same idea of quick removal is carried out with the transmission which is set in the chassis alone and amidships, different from the usual form in which it is combined with the differential housing and countershaft unit. It may be removed without disturbing the motor group on the one hand or the jackshaft group back of it on the other. The latter may be removed, from below, very rapidly also, being attached in such a way as to make this possible.

The motor is very interesting since it represents the latest addition to the list of truck engines. It is of the long-stroke type with a bore of 4.25 and a stroke of 6.5 inches, a ratio of 1 to 1.53. This has offset cylinders and the crankshaft is mounted on ball bearings. It is governed down to 900 rpm, at which speed it develops its maximum torque and 35 horse-



Two Views of the Long-Stroke Motor Used on the New Lozier Truck, Showing the Valve Side and the Opposite Side with Governor



The Lozier Brakes Are Ample. View of the Countershaft Brake of the External Band Type

power. This combination of long stroke, offset cylinders, slow speed and ball bearings is said to produce a very economical outfit, one which will have a very low gasoline and oil consumption. Under average road conditions with a capacity load, an average of 6 to 7 miles on a gallon of gasoline has been obtained. The cylinders are of the L-head type. The camshaft is driven by silent chain.

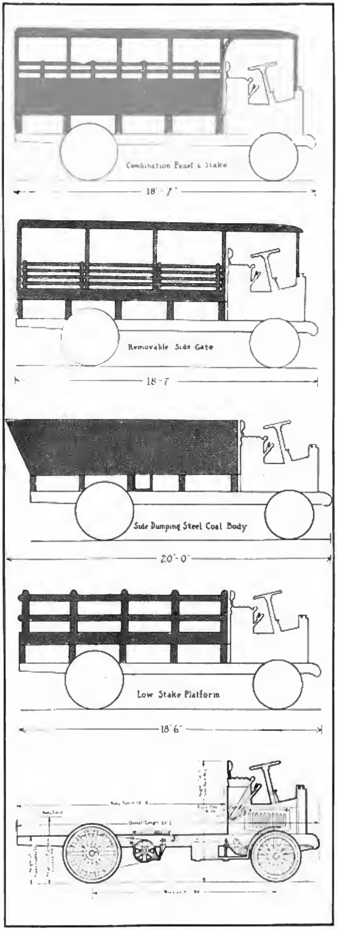
Lubrication is a combination of splash and force feed, the splash level being adjustable from the front end of the motor case. Oil is taken on from the oil cellar in the crankcase by a gear-driven pump and distributed to the bearings and splash pockets, overflowing into the oil cellar through a strainer; the oil cellar has a capacity of 3 gallons. The gauge on the motor indicates the quantity of oil, while the pressure gauge on the dash indicates the pump action.

Bosch, dual system, battery and magneto ignition is employed, the magneto being located on the rear leg of the motor in an accessible position. The governor operates on a valve in the inlet manifold, separate from the carburetor, thus allowing the operator to remove the latter without disturbing the governing mechanism or breaking the governor seal, so that the driver is unable to tamper with the governor.

Specifications of Lozier 5-Ton Truck

Wheelbase	134 in.
Tread, front	66 in.
Tread, rear	71 in.
Overall length, chassis	221.5 in.
Overall width	82.75 in.
Length, platform space	12 ft. 8 in.
Height, driver's seat	86.5 in.
Clearance, front axle	9.5 in.
Clearance, rear axle	13.75 in.
Turning radius	25.0 ft.
Width frame, in front	40.5 in.
Width frame, in rear	34.0 in.
Horsepower	35
Bore	4.25 in.
Stroke	6.5 in.
Normal engine speed	900 R.P.M.
Tires, front	36 by 6 single
Tires, rear	42 by 5 dual
Tire mileage, guaranteed	10,000
Wheel diameter, actual.	
Platform height, unloaded	53 in.
Platform height, loaded	48 in.
Minimum height to clear wheels	44 in.
Height frame, loaded	32 in.
Final drive	double chain
Weight chassis, without body	8,080 lb.
Weight chassis and body, approximate	9,500 lb.
Distribution of load, light	47% front, 53% rear
Distribution of load, loaded	31% front, 69% rear

Special Features: Engine governor driven from magneto shaft, power plant on sub-frame supported by springs, long stroke ball bearing motor, transmission and jackshaft separate units, differential lock, chain cases, frame tapered at rear to allow of springs being set outside of it, drive shaft enclosed in torsion tube, sub-frame set at angle to give straight line drive for shaft, offset spokes in rear wheels, and silent chain drive for camshaft.



Dimensions of the Lozier Chassis and Its Appearance with Several Ordinary Body Forms

From the engine to the transmission the drive is by a short shaft, and similarly to the jackshaft unit, the latter shaft being enclosed in a torque tube with universally jointed front end. The transmission gives four speeds forward and a reverse. The shafts are mounted upon ball bearings, while gears and shafts are of chrome-nickel steel. The speeds are obtained selectively by a single lever, the third being a direct drive and the fourth an overgeared speed for returning light and similar work.

The gear ratios and speeds obtained are:

Gear Ratios and Speeds, Lozier Truck

Speed.	Reduction	Vehicle Speed in Mph at 900 Rpm.
First	43.31	2.62
Second	19.14	5.89
Third	13.20	8.53
Fourth	9.70	11.55
Reverse	60.20	1.87

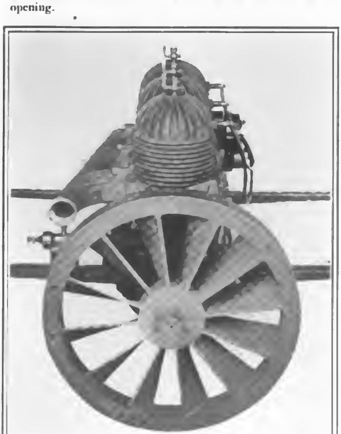
Final drive is by double roller chain, enclosed in chain cases which are kept filled with lubricant. A good sized door on the side allows inspection or repair work. The front tread is fairly narrow, while the rear is wide. The wheelbase is short, 134 inches, as compared with the majority of similar-sized trucks, 140 or over. This results in a very short turning radius, 25 feet, or the ability to turn around in a 50-foot street; this, too, with a body length of 12 feet 8 inches.

The utility of this can not be overestimated for it lessens maneuvering at all times, in narrow streets, in backing out, at railroad terminals and on docks, everywhere in fact. This small saving becomes considerable in the course of a year, amounting perhaps to 6 days or a whole week. Giving this a money value, the utility of the short wheelbase and short turning radius can be calculated.

Features of Palmer-Moore Two-Cycle Motors

WHILE there are not many makes of motor trucks with the two-cycle motor, there is a well-sustained interest in this form, which, taken together with the success of light delivery wagons and small sized trucks having this form of power, would lead to the statement that the future may hold something in the way of possible developments in this very modest priced and simple accessory.

The form manufactured by the Palmer-Moore firm in its extensive shops at Syracuse, N. Y., is of the three-cylinder, air-cooled, three-port type, all three being covered by rotary shutters, the movement of which varies the size of the opening.



End View of the Palmer-Moore Air-Cooled, Two-Cycle Motor, Showing Fan-Spoked Flywheel

The cylinders are of 4-inch bore and equal stroke, cast separately with annular radiating cooling fins on the cylinder portion and vertical, radial ribs on the heads. The cylinders are bolted to the two-part cast-iron crankcase by means of four steel studs for each, these passing through heavy base flanges.

The usual objections to the two-cycle engine are lack of flexibility and high fuel consumption. By means of the rotary shutters, which allow of varying the amount of air, of mixture and of exhaust, these objections are overcome, and what is really a three-speed motor obtained. Each port has three rows of holes, so that, uncovering one, the lowest engine speed, about 500 rpm, is obtained. Uncovering another row gives a higher rate of rotation or the medium speed, while the uncovering of all three brings about the maximum output of the motor and also its highest speed.

These shutters coincide in action, so that when the first row of holes at the intake is opened the first rows at the by-pass and exhaust ports are also uncovered. Aside from the three shutters and their connecting levers and rods there are no valve parts.

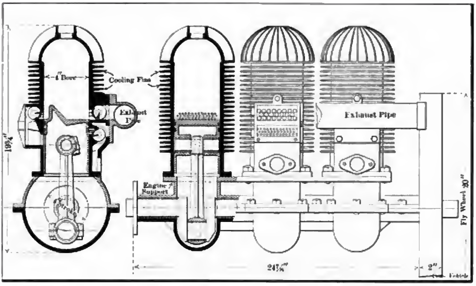
The pistons have two lap-jointed rings each, placed above the wrist pin, while the deflector plate differs from the ordinary in that it slopes abruptly backwards. The pistons are long and light, giving a perfect guide in the cylinders and reducing losses due to the reciprocating action to a minimum.

The over-all length of the motor, which is rated at 18 horsepower, is 26.875 inches, including the flywheel, which is 2 inches wide. The weight complete is 318 pounds, giving 17.6 pounds a rated horsepower.

Cooling is effected by draught upon ribs projecting from each cylinder, the draught being intensified by the flywheel, the spokes of which are shaped to form a fan. Such a fan, being direct-connected cannot stop while the motor is in operation.

Ignition occurs at a fixed point of the stroke and is produced from a magneto geared onto the main shaft. Any other standard ignition system may be used. No batteries are required for starting, yet "spinning" of the motor is seldom necessary.

The carburetor also is set at a fixed opening and delivers into a specially designed manifold which increases the travel of the gases and gives them a chance to heat before entering the cylinders. The driver controls the motor simply by varying the port areas to produce a high, medium or slow speed motor as the conditions may demand. A single control lever on the steering wheel, similar to the throttle of a four-cycle motor, is provided for this purpose, hence the Palmer-Moore is one of the simplest and most foolproof motors ever applied to motor truck service.



Drawing with a Section Through Palmer-Moore Two-Cycle Engine, Which Brings Out the Cooling Fins and Shutter Control Arrangement

HEATING MIXTURES

Since the explosion of gasoline within the motor truck engine cylinders or more correctly, its combustion is a chemical action including the abstraction of heat from surrounding objects, any method which will furnish that heat more readily than the comparatively inert atmospheric air will assist combustion, quicken the action and render it more complete. Moreover, it will produce more power, lengthen the life of the engine and make it more responsive. Producing more power and lengthening the motor's life are both economies, hence this same action lessens the cost of operating the truck. While there is little necessity for such extraneous action during the hot summer months, at all other times there is, and the remedy is herewith presented.

To get uniformly good results, everyone knows a uniform and thoroughly vaporized gas must at all times be served to the cylinders. Unless the mixture be of proper proportion, the burning will be slower. When it is not rapid enough, the maximum efficiency will be lost and phenomena will obtain, such as back-firing, overheating, choking, missing, etc. Then again, if the mixture varies because of pockets that collect gasoline, the burning becomes irregular to correspond and you have what is called loading up. This is usually caused by condensation of mixture at some point between the nozzle and the intake valve of the motor, this load of condensed raw gasoline being drawn into the motor, without sufficient air to form a correct firing mixture. One of the hardest problems the carbureter manufacturers have had to overcome is represented by this condition of choking and stalling on suddenly opened throttles.

All know that water evaporates more quickly on a clear day, when there is no humidity. The same principle applies to gasoline when air free from atmospheric moisture, is taken in through the carbureter. The gasoline is evaporated or absorbed faster, so that instead of misty or foggy mixture, an absolute gas may be obtained, if the air coming in has been dried out by the Col-Mac exhaust method.

Air expands rapidly when drawn into a vacuum such as formed by the intake stroke of the piston, or when heated to an extreme point very quickly. The capacity of the air to take up moisture under these two conditions is almost unlimited. Expanded air, however, is not what is sought inside the cylinder. Air should be taken into the cylinders as nearly as possible to the atmospheric pressure. Taking in dried, warm air from around the exhaust pipe under the Col-Mac system is expanding the air but not to a harmful degree as the cold of the vacuum in the carbureter mixing-chamber absorbs the heat and contracts the air instantly again to less than its original volume. The temperature then is lower than atmospheric, but the warmth has already produced the dry feature required to eliminate the atmospheric moisture. The existence of the moisture in the air is proved by the condensation on the outside of the carbureter and "frosting," where the mixture is right and hot air is not used. The cold body portions of the carbureter are the outward evidence of the vacuum working inside and also proves the temperature inside to be lower than that outside.

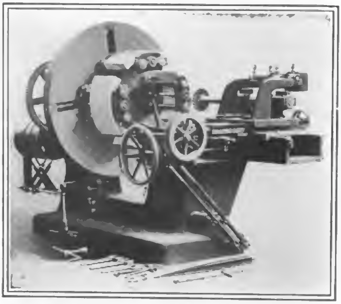
DEFIANCE FELLOE SHAPING MACHINE

The illustration herewith presents a new machine which has been placed on the market recently by the Defiance Machine Works. This is a form of heavy wood lathe and has been designed and constructed for the purpose of machining the felloe sections of heavy truck wheels.

This work is too heavy for the ordinary wood lathe, consisting as it does of turning the outside, inside and edges of large blocks of oak, ash and hickory to an accurate curve, the size of these varying up as high as 8 inches in width by 4 inches in thickness. The machine will accommodate widths up to 12 inches.

The sections, from one to four of which may be handled at once, are placed in the machine with the back edges resting against the parallel bars of the screw clamps for the first or trueing cut. For the second operation, turning the tread portion, they are placed in the clamps with the inner circle resting upon the outside of the parallel bars.

The frame is massive and well proportioned and the space occupied 46 by 118 inches. The horsepower required is 7.5. A full set of cutters and attachments is furnished.



The Defiance New Heavy Turning Machine for Manufacturing Felloes for Truck Wheels

MUNICIPAL SERVICE EXTENSIONS

Indianapolis Displays Its Trucks

ONE of the most unique motor car parades ever held was that in Indianapolis May 24, when all of the motor-driven municipal apparatus was paraded. This was in celebration of the recent reduction of about $150,000 a year in fire insurance rates for the city, made as a result of the purchase of considerable fire apparatus enabling firemen to reach fires much sooner.

In the first place, the city installed two motor squad wagons, this producing a reduction of $35,000 in the insurance rates. Later, two combination hose and chemical wagons, a combination pump and hose wagon and a ladder truck were added. The city is said to have more apparatus with its latest purchases than any city of equal size in the country.

Chicago Buys Four Fire Wagons

The Chicago fire department has let the contract for three squad wagons to the Harder people, the lowest of three bidders. The motor pumping engine, made by the Webb Company, for which the contract was let in November, has been received by the department, and was subjected to test on May 13. In this it was successful, giving a 70-pound pressure at a 1.25-inch nozzle through 600 feet of line, and throwing 600 gallons of water a minute through two 300-foot lines with 1.25-inch nozzles.

A contract has been let by the city of Chicago to the Harder Company for a motor ambulance to be used by the police department in connection with the County Hospital. But two competitive bids were received, that of the Harder people being the lowest. The department is also in the market for two motor patrol wagons. Bids were asked at the same time that the ambulance was advertised, but no competitive bids were received, that of the Harder being the only one submitted for patrol wagons.

New Orleans' New Machine Fast

Upon the occasion of the receipt of the new Kisselkar hose truck by the fire department of New Orleans, Chief Louis Pujol, subjected it to a strenuous speed test, which proved it equal to anything that had been claimed for it. A run of 3 miles was made in 6.75 minutes, including coupling the hose and throwing water. During this run the machine had to slow down four times and make four very dangerous turns. The test of the machine was made with a full crew of seven.

Philadelphia Plans Motor Apparatus

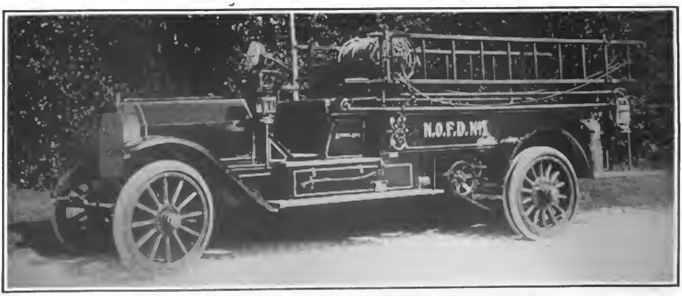
A complete reorganization of the fire department of Philadelphia is planned by the new Director of Public Safety, George D. Porter, which includes the elimination of all horses, in so far as it is possible at this time, and their replacement by modern motor-driven apparatus. It is Director Porter's idea that this will give greater safety to life and property and save a great deal of money.

This action is the result of a citizen's protest against the action of the old political regime, which last fall advertised for eight horse-drawn pieces. The protest halted this until after election, when a newer and more progressive faction was installed. The present plans are comprehensive and include five classes First, building and equipping new stations; second, the purchase of motor apparatus; third, the conversion of the heavier types into tractor-drawn machines; fourth, the establishment of a flying squadron, and fifth, extension of the high pressure protection.

Washington Wants Many Patrols

The city of Washington has but one patrol now, but the head of the department is a firm believer in the motor, and as soon as the money is available proposes to replace 11 horse-drawn patrol wagons with the more modern form. The Emergency Hospital is soon to buy a motor ambulance, following the Providence Hospital, which has an electric.

DENVER IS ANTICIPATING the national Firemen's Convention, scheduled to meet there in September. The great feature will be the display of motor-driven apparatus. At least $200,000 worth will be on exhibition.



KisselKar Hose Wagon for New Orleans Fire Department Which Made Very Fast Trial Run Recently

Commercial Motor Vehicle Patents

JUST as last month, body forms and tires continue to interest commercial car inventors. In addition, the growing importance of municipal apparatus, and in particular fire engines, has brought out a special form of pump for that work.

Gilstrap Steering Gear

1,024,505, Steering Gear for Vehicles, issued April 30 to James M. Gilstrap, Fresno, Cal.—This patent covers the combination of a steering mechanism with a source of power and a method of reversing the application of the same. As the illustration shows, the usual steering rod and cross connecting link are eliminated in favor of a chain, sprocket and pair of levers combination. The rotation of the sprocket thus removes the steering wheels, the connections being such that they move together. Between the motor which furnishes the power and the sprockets which do the driving, two sets of opposite bevels are furnished with a shiftable connection for each. Thus, to steer one way the power is used through one set of bevels, while steering in the opposite direction is effected by shifting to the second set of bevels.

Howard Traction Vehicle

1,024,578, Traction Vehicle, issued April 30 to Henry A. Howard, Lloydminster, Saskatchewan, Can.—This is an arrangement not unlike the Caterpillar Tractor, in that continuous chains contacting with the ground along the whole or greater part of their length are used for a driving member instead of the more usual wheels or tires. The driving belt or apron consists of a series of fairly narrow chains set side by side, but are connected transversely to rotate as a unit.

Lally Side Dumping Body

1,024,636, Side Dump Auto Truck, issued April 30 to George W. Lally, Boston.—This covers the form of a dumping body sometimes called the turntable, in which the actual dumping body is mounted upon a centrally located fifth wheel. When rear dumping is desirable, the body is tilted, but when side discharge is necessary the whole structure is revolved on the central pivot and then tipped. The patent covers the combination of a pair of frames at right angles with bearing rings between them and means for imparting rotation to one frame and its bearing ring. The latter is indicated in the specifications and drawing as a chain drive from the countershaft to a secondary shaft, upon which a gear meshes with a ring gear on one part of the turntable.

Thissen Resilient Tire

1,024,753, Resilient Tire, issued April 30 to Jacob Thissen, Kane, Pa.—This is a spring tire, in which a channel is carried on the felloe with a series of projecting tubes, into which pins project a short distance. The outer or tire portion carries a similar series of pins which project into the outer ends of these tubes, thus forming the driving connection. The distance between the inner ends of the two sets of pins forms the limiting amount of inward motion for the tire, while the actual movement is restrained by a series of spiral springs, one around each tube with its two pins. Side plates cover all this mechanism from mud, dust and water.

Waterous Fire Pump

1,024,919, Pump, issued April 30 to Frederick L. Waterous, St. Paul.—This covers a pump for water or other liquids which has two pairs of cylinders set at an angle to one another with a central crankshaft, the outlet valves and air drum being placed on the inner or central side. The crank has but two throws and the opposite pistons are attached to the same pin, so that when the one on the left is rising or forcing water out the other is coming down or sucking in more water. The rear pin being at 180 degrees, the opposite effect is gained there; that is, the right is pumping at the same time as the forward left one.

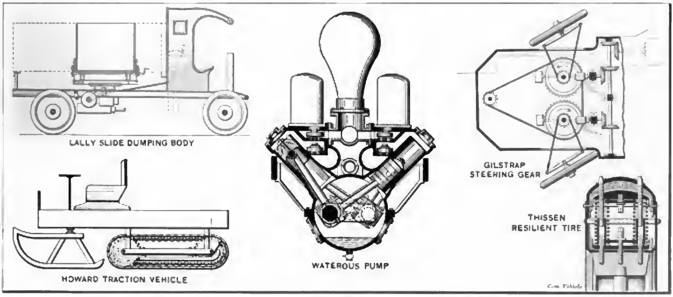
Additional Patents Issued

1,024,601. Terminal Attachment Engaging Device; issued April 30, to Joseph E. Schaefer, Jr., Detroit.

1,024,618. Explosion Engine; issued April 30, to Howard E. Coffin, Detroit.

1,024,652. Motor Road Vehicle; issued April 30, to Frederick H. Royce, Derby, Eng.

1,024,692. Hydraulic Lubricator; issued April 30, to Frank Mueller, New York City, assignor to American Eagle Motor Car Company.



Commercial Motor Vehicle Patents and Ideas of Inventors During the Recent Months. Bodies and Tires Continue to Interest

TRADE and PERSONAL ITEMS

AN accompanying illustrations shows a 6-ton Knox truck which is doing as regular daily work that which heretofore has been considered as a "stunt." This truck is hauling lumber for a railroad tunnel construction up a steep mountain grade 7 miles long, not far from San Francisco. In this distance, there is a total rise of over 5000 feet, an average of more than 710 feet to the mile, making an average grade of 13.5 per cent. Up this, the Knox is hauling 5.5 tons of lumber daily, making two trips regularly and upon occasions three.

Factory Enlargements

International Motor Company has built an extensive addition to its Plainfield, N. J., plant.

Ross Gear & Tool Co., Lafayette, Ind., is erecting a new factory particularly for the manufacture of steering gears for commercial cars.

Hayes Wheel Company, Jackson, Mich., recently established a new hub plant at Albion, Mich. This plant is in charge of G. S. Porter.

Contracts have been awarded for a two-story brick and steel factory and office building at Akron, O., for the Akron Rubber Machine & Mould Co.

The Ideal Commercial Car Company is building a large plant at South and Railroad streets, Akron, O., and will soon commence the manufacture of Ideal cars. This company was formerly located at Detroit.

The Mais Company will increase its facilities. An addition is being built to the present factory, which will add 20,000 square feet, to be completed within the next 30 days. The factory is working day and night to take care of orders.

Negotiations have been completed for the construction of a modern concrete building on Market street, west of 20th street, Philadelphia, for the Longstreth Motor Car Company, local agents for the Alco trucks. The present quarters in Broad street have proven inadequate.

The Goodyear Tire & Rubber Co., Akron, O., has completed plans for another large building to be built in connection with the present group. It will be 400 feet long and 79 feet wide. Building No. 13 is to be remodeled and an additional two stories will be added. This building is 296 feet long and 79 wide.

Latest Literature

Harrison Radiator Company, Detroit, Mich., has sent out a card referring to the radiators.

The Sanford Motor Truck Company, Syracuse, N. Y., has issued a catalogue describing its 1-ton truck.

The Air-Friction Carbureter Company, Dayton, O., is sending out a circular describing the Air-Friction carburetor.

Lambert Ignition Company, New York City, has sent out a circular on its "Tuflame" lighting systems.

The Crescent Motor Truck Company, Middletown, Ohio, has issued a catalogue describing its motor trucks.

Blair Mfg. Company, Newark, Ohio, is sending out a catalogue showing different styles of Blair worm-driven motor trucks.

Brooks Mfg. Co., Saginaw, Mich., has issued a catalogue describing its motor delivery wagon, formerly called the Duryea.

United States Light & Heating Company, New York City, has issued a folder describing its electric self-starter and lighter.

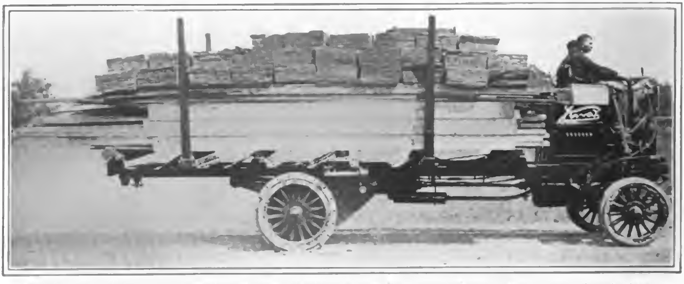
The Hazard Motor Mfg. Co., Rochester, N. Y., has issued a catalog describing the unit power plants for commercial vehicles.

The North East Electric Company, Rochester, N. Y., is issuing a catalog describing the starting and lighting apparatus for motor vehicles.

The Cork Insert Company, Boston, Mass., is issuing a folder on the Carey wood motor pulleys and wood rim iron arm and hub line shafting pulleys.

Cleveland Storage Battery Mfg. Company, St. Louis, Mo., has issued a booklet entitled "Light Your Way by Electricity" describing its lamps and ignition supplies.

P. C. Chrysler, manager of the Western territory for the General Vehicle Company, has resigned.



Six-Ton Knox Truck Which is Hauling Huge Loads Up Mountains Near San Francisco Regularly, Shown with a Capacity Load

Personal Brevities

B. B. Traub, of the W. H. McIntyre Company, has been appointed eastern trade solicitor, with headquarters in New York City.

J. Murray Page has been appointed manager of the new factory branch and service station of the Locomobile Company of America at Los Angeles, Cal.

W. W. Witherby has been appointed manager of the Chicago branch of the General Vehicle Company, which has moved to the Otis building, La Salle and Madison streets.

J. W. Jewell has been appointed manager of the New York service station of the R. C. Hupp Corporation. He was formerly in the engineering department of the Franklin company.

S. W. Seeley, recently of the accessories department of the *Automobile Trade Journal,* has joined the editorial staff of the Automobile Journal Publishing Company, Pawtucket, R. I.

Chas. B. Shanks, formerly with the Winton Motor Car Company and the F. B. Stearns Company, has been appointed general manager of the Pacific Coast branch of the Kelly Motor Truck Company.

C. C. McKinney, formerly with *Power Wagon* of Chicago and the COMMERCIAL VEHICLE, is now with the Chicago branch of the Dayton Auto Truck Company.

KisselKar Bus Which Was Specially Constructed for Hotel Stockton, Stockton, Cal.

R. W. Sherman has accepted a position on the editorial staff of *Motor World.* He was formerly with the publicity department of the Franklin company, Syracuse, and also with the *Post-Standard,* of that city.

John A. Cleary, formerly editor of the automobile and yachting department of the *Philadelphia Inquirer,* has resigned and is now manager of the automobile advertising and news department of the *Evening Telegraph,* that city.

Chas. A. Trask, formerly engineer and works manager for the Cartercar Company, of Pontiac, Mich., has returned from a 5 weeks' visit in Europe, where he has been studying automobiles and other matters of trade interest.

Edward E. Wright has been appointed manager of the central sales district of the McKeen Motor Car Company and has headquarters in the Marquette building, Chicago. This district includes the following States: Wisconsin, Michigan, Illinois, Indiana, Ohio, Kentucky, Tennessee, Arkansas, Louisiana,

Recent Incorporations in the Commercial Vehicle Field

Isotta Fraschini Motors Company, New York City. To manufacture and deal in motors. Capital, $25,000. Incorporators: G. Maurice Beckscher, G. Nettleton Thurbur and C. B. Jacque.

Federal Trucking Company, New York City. To manufacture and deal in motors. Capital, $20,000. Incorporators: Donald B. Abbott, Joseph D. Fackenthal and James L. Kauffman.

Field Electric Bus Company, New York City. To manufacture electric cabs, omnibuses and vehicles of all kinds. Capital, $10,000. Incorporators: Williams Eastman, Cornelius J. Field and Burgess Osterhout.

Magneto-Dynamotor Company, New York City. To manufacture magnetos, dynamos and accessories of all kinds. Capital, $100,000. Incorporators: George L. Henry, Frank B. Moody and Battle T. Moody.

Garden Taxi Cab Company, New York City. To deal in motor cars, etc. Capital, $15,000. Incorporators: Richard Green, G. Rudolph Schulze and John J. Harvey.

Knickerbocker Motor Car Sales Company, New York City. Capital, $10,000. Incorporators: Benjamin Harris, Robert L. Noah and Wm. L. Robertson.

L. A. W. Carburetor Co., New York City. To manufacture accessories. Capital, $100,000. Incorporators: Norman Leinan, Silas Heineman and Hanbury A. Watkins.

D. MacWatty & Co., Inc., New York City. To manufacture lubricating oils, etc. Capital, $5,000. Incorporators: Duncan MacWatty, Herman P. Lowe and William J. Weir.

Dual Wheel Company, 101 W. 42d St., New York City. To manufacture wheels for trucks and all kinds of vehicles. Capital, $300,000. Incorporators: Frederic B. Cochran, Alexander Dow and C. W. Jewell.

Tire Core Company of America, New York City. To manufacture tire cores, tires, rubber goods, etc. Capital, $100,000. Incorporators: Russell V. Stuart, Patrick J. O'Connell and Houston P. Reader.

Gaisty Taxicab Company, Brooklyn. Capital, $500. Incorporators: Hyman Peskin, Marcus Goldstein and Hyman Gordon.

Spectre Motor Company, Brooklyn. Capital, $5,000. Incorporators: Gayton B. Ellis, William Young Chandler and George A. Wingate.

El Arco Radiator Company, New York City. To manufacture motor car parts, etc. Capital, $10,000. R. C. Gildersleeve, C. Philip Coleman and Vernon Monroe.

Eclipse Tire & Rubber Co., New York City. Capital, $50,000. Incorporators: Simon I. Schwartz, Samuel H. Silverman and Harry A. Bloomberg.

Diamond Motor Car Company, Pelham Manor, N. Y. Capital, $10,000. Incorporators: Carl W. Rundlett, Charles W. Jaycox and Frank Davis.

B. F. Goodrich Co., New York City. To manufacture rubber goods, taking over the B. F. Goodrich Co., of New York, and the B. F. Goodrich Co., of Ohio. Capital, $45,000,000. Incorporators: Bertram G. Work, Charles B. Raymond and David M. Goodrich.

Vanderheyden Garage Company, Troy, N. Y. Capital, $5,000. Incorporators: William G. Pike, Eleanor M. Pike and Fred E. File.

Bayside Taxicab Company, Bayside, N. Y. Capital, $5,000. Incorporators: William Wagner, Charles B. Story and Charles Bonner.

Union Electric Car Company, Rochester, N. Y. To manufacture motor vehicles, etc. Capital, $5,000. Incorporators: Arthur McNall, Henry J. Schneider and Harry E. Pramer.

Brooklyn Delivery Company, New York City. Motor trucking business. Capital, $2,000. Incorporators: Maurice A. Lynch, Charles E. McMahon and Eugene S. Lucas.

Simplex Aluminum Solder Company, Inc., New York City. To manufacture aluminum solder, mend truck parts, etc. Capital, $25,000. Incorporators: Charles R. Erkens, Charles Decker and Henry Bender.

Suburban Equipment Company, New York City. To manufacture gasoline engines, machinery, etc. Capital, $10,000. Incorporators: Harrison Gray Otis, Walker L. Otis and Charles A. Barker.

Ball Bearing Novelty Company, New York City. To manufacture devices for machinery, etc. Capital, $6,000. Incorporators: Alex B. Greenberg, Alfred Dioneer and Jacob Solomon.

Sherman Square Auto Renting Company, Inc., New York City. Capital, $8,000. Incorporators: William S. MacMichael, William G. Johnson and John T. Goodwin.

Polack Tire & Rubber Co., New York City. Capital, $700,000. Incorporators: Max Polack, Adelbert Hanschild and Hugo Hoffstaedter.

Lippard-Stewart Motor Sales Company, New York City. Capital, $25,000. Incorporators: Thomas W. Pelham, Thomas W. Pelham, Jr., and Clifford E. Dunn.

Driggs Oil Company, Long Beach, N. Y., To deal in oils, greases, etc., for motor cars and machinery. Capital, $1,500. Incorporators: William S. Driggs, Abraham Lodholz and Henry J. Frink.

Sewell Cushion Wheel Company, Augusta, Me. To manufacture wheels for motor vehicles. Capital, $300,000. Incorporators: I. S. Kearney, E. Maynard Thompson.

Consumers' Rubber Company, Providence, R. I. To manufacture and deal in rubber goods, tires, etc. Capital, $600,000. Incorporators: Percy W. Gardner, Alexander L. Churchill and E. Butler Moulton.

Forest City Automobile Company, Portland, Me. Capital, $10,000. Incorporators: J. A. Clarke and W. B. Clark.

Presto Inter-Rim Company, Portland, Me. To manufacture parts. Capital, $200,000. Incorporators: M. A. Thurston and H. P. Sweetser.

Standard Engineering Company, Belfast, Me. To manufacture and deal in motor vehicle and other mechanical supplies. Capital, $10,000. Incorporators: Austin W. Keating and Maurice W. Lord.

Hassett & Rogers, Inc., Amesbury, Mass. To manufacture bodies, parts, etc. Capital, $18,000. Incorporators: James H. Hassett, Charles H. Hassett and Geo. H. Collins.

Blaisdell Automobile Company, Dexter, Me. Capital, $25,000. Incorporators: Chas. R. Blaisdell, Ernest D. Blaisdell and Wesley H. Judkins.

Avis Engine Company, Boston. Capital, $50,000. Directors: John H. Horton, Edward N. Robinson and E. Sargent Cox.

Charles E. Hall & Sons, Inc., Malden, Mass. To manufacture and deal in motor vehicles, etc. Capital, $5,000.

Interior View of the Pittsburgh Machine Tool Company's Shops at Braddock, Pa., Where Curtis Trucks Are Being Built

Mississippi, Alabama and St. Louis, Mo.

B. F. Fitch, of Louisville, Ky., has been appointed a factory representative of the Autocar and will spend most of his time in St. Louis and Chicago. His business here will be continued under the name of the Commercial Motors Company. This concern has been incorporated with $10,000 capital. R. J. Hurt, who has been connected with the business, will be in active charge of the office.

William M. Boggs, of the Goodyear Tire & Rubber Company, Akron, Ohio, formerly salesman at Philadelphia, is now working New Jersey. H. G. Bruning has been appointed motor truck salesman in Cleveland; F. H. Findlay, salesman at the New York branch, is now motor truck and solid tire salesman of the Brooklyn branch; J. B. Linerd has been transferred to the Brooklyn branch; H. Morton will cover territory in Illinois formerly covered by H. L. Lawson, and R. H. Campbell will cover territory formerly covered by H. Morton in Chicago. Henry W. Hoklas has been appointed to travel out of Minneapolis branch; D. H. Cottrell out of Buffalo; R. S. Grant out of Cleveland, and I. S. Roberts out of the St. Louis.

Recent Large Sales

The Bridgeport Gas Company has purchased four motor trucks, two Locomobiles and two Packards.

The Packard Motor Car Company have sold through its New York office 10 2-ton trucks to the American Express Company. This makes 33 Packards in the service of this one concern.

One hundred and thirty-three GMC trucks are used by San Francisco merchants. The largest number owned by one firm is eight, the next five and there are several who use two and three.

New Commercial Vehicle Agencies Established in May

Place	Car	Agent
Boston, Mass.	Veerac	W. L. Russell Co.
Buffalo, N. Y.	Overland	Overland-Buffalo Co.
N. Attleboro, Mass.	Sandusky	E. R. Crossley
Syracuse, N. Y.	International	William H. Bissell
Washington, D. C.	Little Giant	Motor Truck Corp.
Boston, Mass.	Lansden	William S. Taylor
Minneapolis, Minn.	Federal	Pence Automobile Co.
Portland, Ore.	Little Giant	Gerlinger Motors Co.
Syracuse, N. Y.	I. H. C.	William H. Bissell
Algonquin, Ill.	Franklin	Joseph Cunat
Chicago, Ill.	Harwood-Barley	R. S. Mattoon Motor Co.
Pittsburgh, Pa.	Harwood-Barley	Cartney Bros.
Charleroi, Pa.	Harwood-Barley	W. B. Pfleghardt
Philadelphia, Pa.	Harwood-Barley	Indiana Motor Sales Co.
Covington, Ky.	Harwoed-Barley	Kentucky Motor Car Co.
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Boston, Mass.	Overland, Gramm, Garford	C. J. Fisher
St. Louis, Mo.	Hatfield	Marshall Bros.
St. Louis, Mo.	Alco	Missouri Motor Car Co.
St. Louis, Mo.	Federal	Brown Bros.
St. Louis, Mo.	Autocar	Capen Motor Car Co.
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Syracuse, N. Y.	Peerless	T. A. Young
Syracuse, N. Y.	Chase	Chase Motor Truck Co.
Syracuse, N. Y.	I. H. C.	W. H. Bissell
Syracuse, N. Y.	Garford	Overland Syracuse Co.
Syracuse, N. Y.	Alco	F. P. Anderson
York, Pa.	Mack	York Garage & Supply Co.
York, Pa.	Sampson	Auto & Truck Co.
Bridgeport, Conn.	Peerless	Elm Auto Co.
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Bridgeport, Conn.	Hewitt	Campyon B. Cutter
Bridgeport, Conn.	Pope-Hartford	Consolidated Motor Car Co.
Kansas City	Wilcox	Wilcox Truck Co.
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CONTENTS

The Motor Truck in Laundry Delivery 5
Electric Truck Sales 12
Trucks Legal Status 13
English Tire Wear—Part IV 14
Parades are Popular 16
The Editor's Viewpoint 18
Loss on Motor Buses 20
Sea-to-Sea Delivery 21
Improved Trade Conditions 22
War Rules for Trucks 24
New Truck Warranty 25
Analyzing the Cost of Motor Trucking 26
Municipal Service Extensions 33
Insuring the Commercial Motor Vehicle—Part IV 34
Commercial Car Questions Discussed 39
Motor Truck Conquers in New Field 40
Selling Motor Vehicles on Credit 42
Packard 5-Ton Truck 44
New Detroit Vehicle 46
Tuttle 2-Cycle Motor 48
Trade and Personal Items 50
Recent Incorporations 52
New Commercial Vehicle Agencies 53
Trucks in Municipal Markets 54

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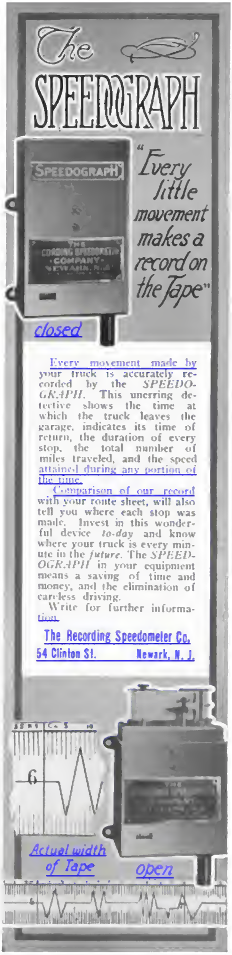
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Vol. VII July, 1912 No. 7

The Motor Truck in Laundry Delivery

A Survey of Delivery Conditions in Three Cities, New York, Chicago, and Philadelphia, Demonstrating the Particular Requirements of the Industry for Despatching and Fetching Laundry Work

EACH trade has its special delivery problem; in choosing a means of transportation it is necessary to find from specific instances the comparative value of different means of delivery. Once decided upon, a thoroughly organized service will bring satisfaction to customers, system to the workers, and will extend a firm's market.

> *THE delivery problem of the laundry is complicated and specific. The chief hindrance to the economical use of motors lies in the number of stops; the latter should be systematically arranged. Loading facilities must be revised to cope with superior service. Delivery costs must be figured; one laundryman estimates his cost per mile with a motor at 5 cents.*
>
> *The motor wagon is a coming proposition with laundrymen, but the latter are not generally satisfied.*

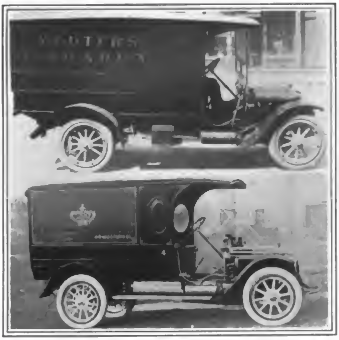
THE delivery problem of the laundryman has, like all delivery problems, its special characteristics. Broadly speaking, the best solution of the problem will be found in a delivery system that will carry heavy loads distances of variable extent and that will carry a sufficient quantity of bundles to minimize as far as possible the number of journeys made each day. Speed in delivery and in fetching work for the laundry is necessary, and the question of time wasted in stops on each trip must be considered. Laundry delivery necessitates more stops, perhaps, than any other delivery; consequently, it may be assumed that some special type and design of motor vehicle is wanted, specially adapted for executing such work with the least cost. The fact that a vehicle employed in laundry delivery is very rarely empty should be remembered, for no sooner are bundles of clean clothes disposed of than bundles of soiled clothes are added to the packages in the vehicle. The laundryman also wants two kinds of vehicle, one for long delivery work and heavy bundles, the other for light work at short distances and small bundles. It is quite possible that these two divisions of the delivery problem of the laundryman may need two solutions, and that two systems must be learned, organized, adapted and applied.

The position in three of the largest cities of the States will give an approximate idea of the situation in all parts of the country. Typical examples will be given in this article of actual conditions in New York, Chicago and Philadelphia. A few general remarks on the situation are given below, prior to a presentment of actual data gained from users of trucks in laundry delivery work.

The establishments most worthy of consideration from the point of view of the motor truck maker are the power laundries, that is, laundries cleaning clothes by means of machinery, all of which employ from one to twenty teams. Each of these power laundries should be a possible customer for purchasing motor vehicles, for each of them will find out gradually that 6 motor delivery wagons will displace 10 horse-drawn vehicles, doing more actual work in far less time and extending effective territory beyond the limits set by horse equipment. This comparison was made by a man in the trade, and it is an assumption founded on common sense that other men will soon see the situation through the same rose-colored spectacles.

As far as collections are concerned the power laundries derive their chief income from supplying the "hand laundries" with finished "flat" work and "rough" work—leaving the hand laundries to do the ironing. In the case of those large laundries, having a dozen or more branches distributed all over the town, the collecting, and the delivering of the ready work also, is restricted to the carrying of big loads to and from the branches. The latter employ boys with hand carts to do the actual house-to-house collection and delivery. Few of the big laundries utilizing delivery wagons bother with house-to-house delivery, and those that do cater to this part of the work simply use the wagon because it enables the boys to carry bigger loads at one time. Their territory is so restricted that it would not pay them to employ motor wagons. Once they install horse equipment they find it possible to enlarge their territory, and if they purchase motor wagons they find that a still wider field is open to them. The laundry that intends to remain a "hand laundry," satisfied with the trade of the immediate neighborhood, is not in the market for any kind of delivery wagon.

There are four main branches of laundry work in the ordinary large city: No. 1, house-to-house work, No. 2 sub-



Body Types for Laundry Service on Two Motor Vehicles Used in Chicago and New York, respectively, on White Chassis

station delivery, No. 3, hotel delivery, and No. 4, office building delivery, such as handled by the towel companies, etc.

The horse delivery problem is far more complicated in the laundry service than would appear on the surface. In the first place, few laundries own their horses and wagons; the majority hire them by the week or month. There are three systems in use: 1. Both horses and wagons belong to the laundry. In this case it is almost impossible to obtain correct cost figures. No one seems able to give even the approximate cost without a careful examination of books and records for the past year. The ordinary costs of feed and stabling vary in various stables; drivers get from $14 to $19 per week; sometimes 1, sometimes 2 boys are carried on the wagons in addition to the driver, and this makes a detailed cost estimates for the day or week a difficult matter.

2. Both horses and wagons are hired by the week, including driver and boys. In this case the owner of the wagons takes the whole responsibility for the correct delivery, for the honesty of the employees and for accidents, etc. The laundry owner pays for such service $31 per week for the 1-horse teams and $37 per week for 2-horse teams. The 2-horse team is attended by 2 boys. In such service the wagons cover about 25 miles each day.

3. Wagons are owned by the laundry, but horses are hired. The average price paid for the hire of a horse is $35 per month; in some cases $33, in others $36-$37. The driver's wages are usually $14 to $17 on 1-horse wagons, or $15 to $19 on 2-horse wagons. Boys are paid from $4.50 to $6 each.

Stops Prove the Major Hindrance

The chief hindrance to the economical use of motor wagons in laundry work lies in the number of stops. Though the time consumed in each stop does not average over 4 minutes and in most cases not over 3, yet the aggregate time of stops mounts up fast, and wear and tear on the vehicle and tires is greatly increased over other service. Routes with 150 stops are common in Chicago, some machines covering routes almost as busy as this twice every day.

Generally speaking, with a horse-drawn vehicle the number of persons on each is usually 2, sometimes 3, consisting of a driver and 1 or 2 boys. The motor wagons go out in charge of 1 man, who runs the vehicle, and loads and unloads the baskets of laundry at the branches. From 8 to 10 stops is considered a full trip, when several trips are made each day, taking into consideration that each stop means at least 1 large basket full of laundry and from 5 to 20 smaller paper packages.

The weight of a full load naturally varies according to the quantity sent in by the various branches, the weight being a minor consideration with the driver. His duty consists in calling at a certain number of branches or hotels or restaurants and in delivering what he has for them and taking their dirty linen with him. Whether the total load carried is more or less than the "rated capacity" of the wagon never worries him. Ten baskets, ordinarily full with linen (weight at least 100 lbs. and sometimes 160 lbs. each), make up a load of about 1500 lbs. In addition, the 100 to 200 small packages carried on the same trip may amount to 500 lbs. more. One driver in New York admitted loading as much as 3000 lbs. on an Atlas two-cycle truck rated at 1500 lbs.

Deliveries practically always are made simultaneously with collections. In New York the bulk of the heavy work in delivery and collection is concentrated on Monday and Tuesday (collections predominate), and Thursday and Friday (deliveries predominate); Wednesday and Saturday are comparatively light days as far as delivery to and from branches is concerned.

Laundry being essentially a bulky commodity, especially in the soiled state, a roomy wagon is necessary. For ordinary delivery work, such as discussed in this article, a 1-ton or 1½-ton car, capable of making 20 miles per hour, is preferable. Tires should be generously large, those smaller than 4½ in. being unsuited for the work of rapid driving over car tracks, rough pavement and holes in the asphalt. One 1-ton truck examined carried 35 x 5 in. Firestone non-skids on all four wheels, and was remarkably free from tire trouble. The two front tires lasted 9500 and 10,300 miles, respectively, while the rear set gave good service for 7000 and 7600 miles, respectively. Another, a smaller wagon, was equipped with 32 x 4½ Diamond and Goodyear non-skid tires and also gave good service. Both were speedometer-equipped and carried spare tires, the Buick being fitted with demountable rims of the latest Firestone type.

Undoubtedly the weak point in the whole system is the loading and unloading at main buildings. Time needed for loading wagons is generally unnecessarily long, the delay being not so much due to the slowness of the men in han-

Record of a Trip Made by a Two-Horse Vehicle Owned by the Champion Laundry in New York

Time	Location	Number of Stop	Length of Stop
10:55	Started loading all kinds of finished and unfinished work for uptown branches. Eight large baskets and upwards of 200 separate bundles.		Mins.
11:20	Finished loading	..	23
11:35	Start for uptown	..	..
11:40	88th St. and Ninth Ave.	1	1
11:46	201 West 70th St	2	1
11:51	76th St. and Amsterdam Ave. To let off one boy with six bundles, who rejoined vehicle at 79th St.	3	10 seconds
11:53	346 Columbus Ave	4	1
11:56	404 Amsterdam Ave. and 79th St., to pick up boy with dirty linen	5	2
12:02	2371 Broadway, laundry branch. Big load taken off, 13 bundles, 6 boxes	6	2
12:07	Broadway and 92d St., to let boy off with bundles	7	20 seconds
12:10	Columbus Ave branch. Big load taken off. 16 boxes, 1 basket	8	3
12:16	Broadway and 94th St., to pick up boy	..	No stop
12:18	2642 Broadway, sanitary laundry	9	4
12:26	3874 Broadway, Devonshire laundry	10	5
12:32	Other side of Broadway	11	6½ seconds
12:40	Broadway and Tenth Ave., to water horses	12	1
1:01	882 Ninth Ave., to collect dirty linen	13	2
1:05	Arrived home	..	Lunch till 2 P.M.

Number of stops—13, number of men—1, with 2 boys; mileage covered—7; average stop—3 minutes.

dling the baskets as to the remissness of the inside force in not having the baskets fully ready and counted by the time the drivers are scheduled to start. Poor elevator installation also causes delay. Although men have freely admitted having strict schedules, they just as freely admitted being "behind schedule" nearly all the time, on account of long waits at main offices. Actual timing at several laundries in New York showed the time elapsing between the arrival of a wagon with a load of soiled linen and its start with a new load of clean laundry, to be 45 minutes, 76 minutes, 60 minutes and 55 minutes, respectively. In contrast with this is the very good time made by both horse and motor wagons on their trips, as seen in the tables of actual journeys made.

Speed in Small Cars Wanted

With reference to the general interest in the motor wagon for laundry work shown by users, the latter do not seem to be satisfied with the stage of development of the smaller car. They want speed and yet do not want the expense of pneumatic tires, though the speeds at which many of these small trucks operate is death on hard tires and, with them, on machinery.

Drivers do not appreciate that with a hard tired vehicle haste is waste. In a last year's run, proof of the waste of excess speed was given by the arrival at the journey's end of heavier slower trucks first, while the smaller vehicles under 1 ton, capable of a road speed of 30 miles an hour and over, were lucky to get in at all without penalization. The speed question, directly connected to the tire problem, is one of the most serious confronting the small motor wagon to-day. Since many of the machines are even lighter than a touring car, drivers cannot understand why it should spoil the machinery to attempt touring car speeds.

High wheels on these small vehicles are common in certain cities, Chicago, for example, and with the small tires on good roads seem to stand up well for their cost. A lower center of gravity might be an advantage, however, on the present cars of that type. There seems to be an unnecessary following after horse-vehicle practice rather than an adaptation fitted for motor use entirely.

Improve the Smaller Vehicles

The experiences the laundries are having seem to prove that the smaller gasoline cars are in a less advanced stage of development than their larger contemporaries, and yet the demand in this field is strong. To produce an efficient small vehicle at a cost which can be met by the smaller merchant is a problem worthy of some great engineer.

The total number of laundries in Greater New York exceeds 6000, and may be classified as follows:

Power laundries	160
Hand laundries	5000
Chinese laundries (estimated)	800
Total	5960

The principal power laundries are situated as follows:

1. Downtown, below 14th Street—	
West of Broadway	15
East of Broadway	3
Total	18
2. Central section, 14th-59th Streets—	
West of 5th Avenue	42
East of 5th Avenue	32
Total	74
3. Above 59th Street to Harlem River—	
West of 5th Avenue	24
East of 5th Avenue	15
Total	39
4. Bronx—	
Total	6

The limits of delivery vary a great deal. One well-known New York laundry supplies residents of White Plains, 23.6 miles, and Mt. Vernon, 18.4 miles, with clean linen during the summer months, being enabled to render this service by the installation of two Buick motor wagons which make the trip to White Plains late in the evening, using about 3½ to 4 hours for the complete trip. The same laundry reports that its installation of the delivery wagons opened up to them the entire territory on the upper west side, above 150th Street, where a number of its branches now have been located.

The daily mileage of vehicles employed by New York laundries, averaged from 5 examples, is as follows:

One-horse wagon (4 trips per day), 16 miles.

Two-horse wagon (4 trips per day), 18 miles (longer individual trips).

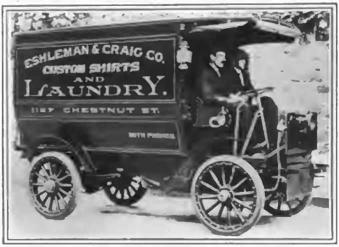
Some two-horse wagons reached 25-28 miles in one day, when working exceptionally favorable.

Record of a Trip Made by One of the Elite Laundry Trucks in New York

Time	Location	Number of Stop	Length of Stop Min.
2:25	Arrived at laundry with load of dirty towels, at 56th St.	..	30
2:45	Start with full load of 9 baskets of linen and smaller packages.	..	..
2:48	Eighth Ave., for 12 dry cell batteries. Batteries fixed	1	37
3:30	Bristol Hotel, West 49th St	2	4
3:40	4 West 40th St	3	6
3:48	5 West 39th St	4	3
3:53	649 Sixth Ave. (between 37th and 38th Sts)	5	0
4:16	50 West 29th St	6	19
4:27	31 East 29th St	7	0
4:37	414 Fourth Ave	8	4
4:47	117 West 21st St Back to 56th St	9	9

Number of stops—9; number of men—1; mileage covered—5; average stop—4 minutes. Driver acted as collector and had to count work, receipt money, etc. Laundry made a specialty of towel and restaurant linen; conditions therefore somewhat unusual.

Two Good Examples of Laundry Motor Vehicles. The Lower One Shows How Well the Body Can Serve as an Advertising Background



A Distinctive Type of Body Favored by Laundry Men

Motor car (5 to 7 trips), 45 miles.

Mr. Anderson, manager of Wallach's Laundry, owning 2 motor wagons, said that long waits at the home office made it undesirable at present to use motor wagons exclusively for delivery service. He considered that if once some system under which these unnecessary long waits for loads could be eliminated, their delivery problem would be solved. He had no doubt that the motor delivery service was far superior to horse wagons, especially so in the case of long trips at high speed. Deliveries as far as White Plains and Mt. Vernon could not otherwise be made. With horses such a service would be impossible, as it would be a full day's work for a team to get that far uptown into the suburbs, to say nothing of the delivery work and the return trip. The motor wagon, in Mr. Anderson's opinion, has opened up an entirely new field of work, which can be served now as expeditiously as patrons up in 135th Street and thereabouts could formerly be served.

It costs a good deal more to run one of these two wagons than it does to run a team of two horses; but the motor does work which no team of horses could render, so the comparison of cost is not fair. Mr. Anderson considered that there could be no actual comparison, for the satisfaction, speed and long range of the motor have to be taken into consideration, making a lot of difference in the figuring of costs.

Delivery Costs 5 Cents Per Mile

"As a matter of fact," said Mr. Anderson, "I may say that each mile traveled by one of my delivery wagons (motor) costs exactly 5 cents—or 85 to 95 cents (at the prevailing speed of 17 to 18 miles per hour for each hour it is running. That is not too much to pay, but it is more than the automobile manufacturers tell you when you ask them for cost details."

With these trucks Firestone non-skid tires are being used on all wheels, 35 x 5; they last about 8000 miles each, with careful handling. The tire cost, therefore, is about 3.75 cents for each mile; to this is added 1 cent for gasoline and 1/4 cent for oil, these items making the 5 cents per mile. These figures were obtained after 9 months' experience.

Other benefits obtained from these wagons are the facts that they are distinctive, with an easily remembered body serving as a good advertisement. Going at a good speed along the upper stretches of Fifth Avenue and Broadway they have a certain advertising value at which may be considered as quite a factor in getting new business.

If long waits at the home office could be eliminated, Mr. Anderson considered that still better value could be obtained. The wagons only have been overhauled once. They have covered 22,000 and 13,200 miles respectively.

The Champion Laundry, of 456 W. 55th Street, has not installed motor vehicles in their delivery service because of the dissatisfaction of the management with the large size of repair bills.

Some experience in this way had been had with pleasure cars, and it is feared that truck repair bills would be even bigger. Mr. Chesney, of this laundry, stated that unless he could obtain a good guarantee of repairs made at reasonble cost he would not buy motor delivery wagons.

Chicago Offers Big Field

There are 325 steam laundries in the city of Chicago.

Of these 200 are able to support modern delivery systems, laundries with enough patronage to afford efficient delivery equipment. Twenty-five thousand men and women are employed in these plants, the weekly payroll amounting to as high as $75,000.

In the work of collecting and delivering the laundry product nearly 2000 horses are employed and 1500 wagons, the average of each vehicle for the day being in the neighborhood of 18 miles, with a load of 500 pounds. The adoption of motor wagons for this work would save to Chicago 4 1/2 miles of street space.

Motor wagons in the same service are covering as high as 100 miles a day with a load of 900 pounds, though the average horse load is 50 miles with 800-pound load.

It is impossible ot say just how many Chicago laundry firms at the present time are using motor trucks in their work for many are served under contract by separate companies, and others buying motor wagons every day make it almost impossible to keep up with the procession. It is safe to say, however, that sixty motor wagons are now operating for Chicago laundry industries, many of the machines doing the work of three one-horse wagons at a cost of upkeep about the same as 1 1/2-horse vehicles. Ninety per cent of these motor wagons are of 1-ton capacity or under; fully 60 per cent are 1500-pound capacity vehicles.

In Chicago practically all the big hotels have their own laundries, thus at the start leaving out a branch of laundry delivery work which is important in New York and other large cities.

Record of a Trip Made by One of the Wouters' Laundry Trucks Operating in Chicago

Stop	Distance, Mile	Number of Packages	Length of Stop		Distance Traveled per Package Mile
			Min.	Sec.	
1	1/8	2		15	1/16
2	1/8	2		45	1/24
3	3/4	5	1	10	3/20
4	1	3	1	5	1/3
5	1/4	4		45	1/16
6	1	3		15	1/3
7	1	1		16	1
8	1/8	6	2		1/48
9	1/4	2		15	1/8
10	1/2	6	1	15	1/12
11	1	5		15	1/5
12	1/2	3		20	1/6
13	1/4	3		35	1/12
14	1/2	1		18	1/2
15-16	3/8	18	2 5		3/146
17-18	1/4	5	2	40	1/20
19	1/8	4	1	30	1/32
20	1/8	5	1		1/40
21	1/8	7	3		1/56
22	1/4	12	2		3/48
23	3/4	1	1		3/4
24	1/2	2		40	1/4
25	1/8	3	1		1/24
26-27	1/2	7	2	20	1/14
28	1/4	1	1		1/4
29	1/8	3		30	1/24
30	1/8	4	1		1/32
31	1/8	4		40	1/32
32-33	1/8	5		20 30	1/40
34-35	3/8	2	4	30	3/16

Total miles—18; number of stops—35; total number of packages—130; average run per package—.138 mile; average stop—1 minute, 9 seconds; average run per stop—.51 mile; average packages per stop—3.71.

The towel exchange companies, having different conditions to meet than the ordinary laundry, and there being few firms of this class in proportion, have little to do as yet with motor trucks. The delivery work is in the loop, or central business district, very largely, where traffic is heavy and alleys narrow and crowded, making for many long waits and hindrance of efficiency, a fact precluding the motored vehicle, at least for the present. The Monroe Barber Towel Co. is, however, trying out a motor wagon in the line of barber supplies where the runs are longer and traffic not so congested, but has not had the service in operation long enough to give out any figures. Stops average 3 minutes, whereas in some of the office building deliveries by other towel companies waits of an hour are common.

To note every laundry that is using or experimenting with motor wagons in Chicago is unnecessary, but it would be wise to touch upon the general conditions of operation of a number of representative firms as pointing the way to the general trend in laundry work, and opening up lines of thought which will lead toward the solution of the problems now at hand.

The Bissell Laundry is operating five motor delivery wagons of 1500-pound capacity. These cars run from 35 to 45 miles per day, visiting twenty substations. The average horse trip is 15 miles. The average load weight is 1400 pounds and the number of packages 200 to 300. A horse load averages 600 pounds. The five vehicles have displaced 10 horses and are covering more territory, with larger loads. Originally using 17 horses, the firm now owns but 7 the rest having been sold. The cars have been in use for two years. Tires last on the average about five months, and being of the hard type on large buggy wheels, are comparatively cheap to replace.

The cost of operation of each car per day is about the same as that of one and one-half horse vehicles, while the work done is equivalent to that of five one-horse vehicles. Stops are from 3 to 10 minutes in length, the average being about 4 minutes. The cars are cared for in the company's own garage.

This company is very much in favor of the motor delivery wagon as a factor toward increased business and toward facilitating the delivery of packages, especially to distant points.

Uses Twelve Motor Delivery Wagons

The Brooks Laundry has in operation twelve motor delivery wagons, but at present is not willing to give out any figures in regard to their operation or use. One car running for one of the branches of this firm is making an average of 30 miles per day in transfer work, with an average load of 600 pounds. Two one-horse wagons have been displaced, but the truck is covering more territory. The machine has been in use one year. Tires, which are pneumatic, last from 5000 to 6000 miles on the average. The firm does its own smaller repair work and garages its own car. More machines will be added to the one now in use in the near future if present plans carry.

The Oakland Laundry operates two 1000-pound motor delivery wagons. These machines cover three routes each and average about 17 miles per trip. Three trips per day are made on the average, the daily mileage ranging between 45 nd 55 miles.

The average trip made by this firm with their horse wagons is approximately 8 miles, 20 miles per day being the work of these vehicles. The average number of packages on a motor delivery wagon load is 240, and about 40 stops are made per trip. The work is practically all to substations.

In laundry work all the way through there is seldom a necessity for overload, so that trucks in this service seem to have but little tire trouble with correctly designed machines. Those showing the worst record in this line are those of course with the most stops and worst roads to meet. The average load weight in the case of the Oakland Laundry is 700 pounds.

Each machine in operation is accomplishing the work of more than two one-horse wagons. The machines have been used for eleven months. The average stop is 2 minutes, so that the machines have a chance to operate most of the time while on the road.

The two machines cover the south side of Chicago, delivering and collecting from 80 to 100 substations, ranging from 12th to 63d Street, over an included area of about 35 square miles. The company garages its own cars.

The Commonwealth Laundry delivers direct to customers with no substations, operating at present one 1000-pound motor vehicle. This car covers one route of about 45 miles per day, leaving the plant at 7:30 a. m. and working until 6 p. m., traveling over a greater part of the north end of Chicago. The average load is 500 and 600 pounds, the car doing the work of about two and one-half horse wagons. The daily mileage is more than twice that of the horse vehicles.

This company realizes the value of long hauls and does not begin collecting or delivering with the motor vehicle until some distance from the plant. The nearer delivery work is done by horses. The car is cared for in the company's barn, the ordinary repair work being done by the driver. The car has been running but two months, but the firm is much pleased with its work and expects to add other cars to the equipment at a later date.

Delivery Averages 45 Miles Per Day

The Adams Laundry is operating two 1000-pound motor wagons, delivering direct to customers without sub-stations. These machines each cover one route each day, traveling about 35 miles in a day's run and delivering north as far as Evanston and environs, a distance of 12 miles.

On these runs bad roads are a feature and a great hindrance to better performances. The high-wheeled hard-tired vehicles used sink in soft roads, so that muddy or sandy roads are a great hindrance. Larger tires than are now fitted would be an advantage for some of this work. With the rutty surfaces also the high center of gravity of these vehicles is a disadvantage which may be overcome later.

The maximum horse trip is about 20 miles with this firm. The motor vehicles with 35 miles to their credit are not doing quite twice the work of the horse wagons on distance, but more than make up for it in load. An average load of 1000 pounds is carried, so that really each machine is doing the work of two horse vehicles. In fact, three wagons have been displaced by the two trucks, the difference being made up in extra mileage. The machines have been in use one and one-half years. Tires last about 5000 miles. The average delivery stop is 3 minutes. During the whole of a year's running horses were used for the motor runs but once, and then only through fear of the motor vehicles freezing on

Another Type of Laundry Vehicle Body

Fleet of Motors Used by Wouter's Laundry in Chicago Service

account of low temperature conditions. The firm covers the greater part of the city of Chicago in its work, takes care of its own cars in its own barn and is enthusiastic over the performance of the motor vehicles.

The Golden Rule Laundry is using one 1000-pound motor wagon over one route, in house-to-house delivery and collection. It is well to remember that in nearly all of the laundry work the load is constant and not decreasing, as in most lines of delivery work. The machines handle collections as well as delivery, so that as fast as they unload packages in most cases an equal load is taken on. This has much to do with the efficiency of a truck, the fact of having it at all times carrying goods.

Short Runs Make Delivery Expensive

When the user makes the statement in this case of the Golden Rule Laundry, that the truck is not satisfactory, it is interesting to note how it is used. In the first place the run is short. The horse wagons make trips of 2 miles each, and in applying the motor wagon the users have kept this same length of route, 2 miles. The saving is in the extra speed of the truck, which this firm claims can make a trip in half the time of the horse wagon. Two hundred to 225 packages are carried per trip, the average load being 1000 pounds, sometimes 1500, an overload of 50 per cent. The truck is getting the blame.

The horse wagons make three trips per day over the routes, the motor wagon five, making 12 miles as the horse mileage per day according to the statement of the firm, and 20 for the motor wagon, yet when asked for daily mileage the horse rig was quoted at 20 miles per day and the motor wagon at 25. If this is the real mileage there must be a grave fault in the loading and unloading system if the truck can make a trip in half the time of a horse wagon and yet actually covers but 5 miles more in a day. Undoubtedly there is some mixing of figures on this point. The machine has displaced two horse wagons and has been in use two years. It is quoted as being too light for the work, which can be easily seen from the foregoing overload figures. Tires last six months and are of the solid type.

The upkeep of the car amounts to about $150 per year. Outside of this come drivers wages, fixed charges, gasoline expense at 18 gallons per week, oil at 3 quarts per week, etc.

The average daily stop is 4½ minutes, the chief delay being in waiting for the wrapping of bundles. Nine substations are visited in the course of a trip. The company takes care of its own car.

Davies's laundry has 15 horses working in the house-to-house delivery of its laundry service, most of the trips being long. This laundry aims to cater to a high-class trade at a slightly higher price and hence covers the whole city. Where horses are used this means a long run on one day and a rest the next, horses making often 30 miles in a day.

For the last seven months a 1500-pound motor delivery wagon has been carrying the laundry bundles to the more distant points under contract. During all this time there has not been a hitch in the service, though the contract company doing the work put up a bond of $100 for delivery delays. Though last winter was especially severe not a dollar of this has been touched. This machine is doing the work of three horses. It travels 80 to 100 miles every day and makes from 140 to 150 stops, traveling north as far as Lake Forest, a distance of 32 miles.

For nearer service electric vehicles are being considered, although the question of speed is considered a drawback.

The Peerless Laundry is operating one 1500-pound motor wagon on pneumatic tires. This car makes 60 miles per day, making two to three trips out from the laundry plant. It has taken the place of three horses and two wagons. One driver is also displaced. It has been in use one and one-half years and costs for operation on the average, including everything, $8 per day. Ten to 25 stops are made per trip, with a general average of a 3-mile run between stops. Stops are long, averaging 10 minutes. The machine is in use between various substations throughout the city.

This laundry is not in favor of electrics on account of their lack of range and speed, and the seeming necessity for hard tires. The pneumatics used on the present cars last about 5000 miles. These cars average 18 miles per hour on the road.

The Quick Service Laundry is using one car for its longer hauls. This machine averages 25 to 30 miles per day with a 1500-pound load. An average of 250 packges is carried per trip. Seven hundred pounds is the maximum load used with horses for the same firm, their average daily mileage being around 18 miles. This truck has displaced two one-horse vehicles and covers more territory. It has been in use seven months. It consumes about 5 gallons of gasoline a day and 3 pints of oil. Pneumatic tires are used with a patent filler and 10,000 miles are obtained from them, according to the manager of this firm. Delivery is to barber shop substations, and the average stop is 3 minutes. This firm also is considering electrics for house-to-house work nearer the plant.

Speed and Pneumatic Tires Wanted

Hard tires are considered inadvisable for laundry work by this firm also, on account of the high speeds. The day's runs made in this service are not considered, in this case, too long for the electric vehicles, although the latter are more often used for smaller mileage and near service.

Munger's laundry uses only horses and is not intending to use trucks. The wisdom of this course can be seen when the firm states that on account of downtown delivery, etc., its average run is 2 miles, and only two trips a day are made by horses.

Wouter's laundry possibly has had more experience with motor wagons than any other in Chicago. Starting with the use of a Knox one-lunger in 1905 the firm now has a fleet of five up-to-date cars operating on a good schedule. The present system is to be reorganized in the near future to get even more service out of the trucks than is being obtained at present.

These machines deliver to substations. The average run from the main plant is 5 miles, while the daily mileage is around 50. Horses with this firm make 20 miles per day, averaging slightly less.

An exception to this rule is shown in the case of one mule in the service of this laundry, which covers a route of 12½ miles three times a day on three days in the week and twice a day on others, this on about half the feed of a horse. One hundred and fifty stops are made in the course of a day's work. The mule has worked in this manner for four years and is still at it without ever having been sick a day. This sounds like a record. The trucks run on the average six hours per day.

Examples of Operating Cost

One route covers 7½ miles and is made three times a day, with 40 stops per trip. Another of 24 miles is made twice a day, with 35 stops per trip.

The record run of any one truck was an observed trip made on May 7, 1912, when 16 miles were covered in 1½ hours, with 48 stops. Stops averaged 40 seconds each. (See p. 8.) Costs of operation are figured in part as follows:

Depreciation is put at 20 per cent.

Repairs, $1.00 per day.

Garage 50 cents per day (contract).

Insurance (liability), 36 cents per day ($100 per year).

Gasoline and oil about $1.50 per day.

Tires last 5000 miles.

Altogether, with the exception of the depreciation figure, the cars are costing this firm about $95 per month apiece.

An analysis of these figures brings out some interesting facts: Figuring roughly the monthly cost of operation as $100, and the average daily mileage on the basis of two trips per day the cost of truck operation works out at 11 cents per mile.

Since the distance covered per package is about .14 mile the cost of delivery per package so far as the truck expense alone is concerned is .14 × .11, or $.0145, somewhat less than a cent and a half per bundle. Counting driver's wages at $75 per month, the cost per mile rises to 19 cents and the cost per package to 2.66 cents as the complete cost. The cost per stop was 9.7 cents.

Altogether the motor wagon is a coming proposition with the laundrymen of Chicago. The city is growing at the rate of 60,000 persons a year, and many firms are keeping up suburban branches at a loss, in order that they may be in the field when these locations are centers of flat life.

The Situation in Philadelphia

In Philadelphia there are 265 white laundries and 404 Chinese, giving a total of 669, or in round figures 700. The largest laundries are the following:

The Principal Laundries of Philadelphia

Name	Horses	Wagons	Motor Vehicles
Holland	40	15	0
Forrest	40	27	3
Market St.	Owned by Wanamaker's, who do collection and distribution		
Elite	20	17	0
Quaker City	16	14	2
Excelsior	22	22	1
Nonpareil	16	10	0
Excellent	11	10	1
Pilgrim	25	25	Contemplated
Troy Steam	10	9	1
Neptune	10	7	1
Chute's	10	8	Opposed to motors
Eshleman & Craig	5	4	3

Some makes of cars being used by laundries in Philadelphia are as follows:

Ford	6
Autocar	5
Franklin	1
Chase	1
Martin	1
Buick	1

The Pierce Laundry Co., 435 North Broad street, washes and mends overalls at a weekly rate of 15 cents. The delivery cars call at the various shops and factories for the overalls, bring them to the laundry and after the work is completed return them to the workmen at the factories on a C. O. D. basis. As the factories are somewhat widely situated this makes the work almost entirely of the long-haul type, but with many very long stops.

The proprietor uses only 2 1-horse wagons, and gives as his opinion that a motor would not be either successful or economical on account of the large number of stops. The entire weekly output is delivered with a total of 240 stops; that is to say, around May 1 this firm was collecting overalls from 240 different factories. Some of the stops are an hour, due to going through the factory delivering the overalls and collecting the money from the various men. Despite the manager's opinion, there is or should be a good proposition for a very low-price motor, so that the waiting losses would be minimized as much as possible. The packages in general weigh 2 pounds apiece, are approximately 10 inches long and not over 4 inches in diameter. On this basis a small delivery car would accommodate 1100 in two loads, which would be an average of almost five to each one of the 240 stops.

The Baldwin Overall Laundry & Supply Co. treats overalls on the same plan as the Pierce just described, but, in addition, takes in all other classes of laundry. In the delivery service this firm uses 2 1-horse teams and a Martin light delivery motor. A feature of this overall business is that it is fairly continuous, that is, they are collecting all of the time and deliver as soon as convenient after the work is finished. This makes a fair proposition for the delivery wagon to work on when there is enough additional business to keep it busy all the time. In the Baldwin business the car is used for collecting and delivering and is kept busy as much as possible, the horses being taken off when the work is light. The car is used on the longer hauls when there is work for both car and horses. It is used mainly to save time in collections and deliveries. In this work it has displaced 2 additional 1-horse wagons and does considerable more work than they did, although the firm cannot state how much either one did or does with any degree of accuracy.

Special Service for Department Store

The Market Street Laundry dovetails into the Wanamaker business. Wanamaker's delivery manager has charge of all collections and deliveries. All of the sixty Wanamaker cars are used and are collecting and delivering all of the time. They work over a circular area of 20 miles radius from the store on Market street. No separate account is kept of the laundry business, it being considered a necessary adjunct to the store. As all of the cars collect and deliver material at times, it would be very difficult to keep such a record. The manager states that it would be impossible to handle this business without the machines. Horses practically are not used, but two 1-horse wagons are used at times on very short runs of ½ mile or less from the store and in the business district, which the cars would seldom be likely to visit.

The Quaker City Laundry uses sixteen horses, fourteen wagons and two cars, a Ford and a Franklin, with enclosed panel bodies. The cars are considered more economical than horses, and the delivery superintendent stated that an up-to-date laundry could not get along without some cars. He said further that they are only economical when handled right, by which he must have meant sent over the routes where they would show to the best advantage.

This laundry has not any special facilities for loading or unloading either machines or wagons. It is located on the corner and is a modern brick two-story building. The cars are backed up to the curb on the two streets and the material carried to them from the elevator. When studying the building and loading arrangements one of the cars was being loaded on the side about the middle of the building, which necessitated carrying every parcel the whole length of one side and half of the other of the building. The packages are brought out in quantities by all of the men working at once, including the drivers, delivery superintendent and his assistants. They are laid out on the sidewalk and sorted there. This is possible because the firm has built a concrete walk from the building to the curb on the two street sides, and there is no residences near enough to influence this work in any way.

Dealing With Long-Haul Work

This firm is located so far out that the majority of its deliveries and collections are of the long-haul type. This makes possible the scheme of having two set times for all wagons and cars to leave the plant. These are at 9 o'clock in the morning and 1 in the afternoon. Having all the wagons leave at once makes it possible to bring out all the finished laundry in the plant and sort it on the sidewalk, the drivers aiding one another in this work.

By makers, the laundry business is considered a difficult one to sell because few laundries have any ready money, few keep a close enough account of the business to know what collections and deliveries cost them, while the majority are somewhat skeptical about the utility of an automobile in their business. The one Buick in use is owned by the Fair Hill Laundry, at Norris & Blair streets, and has been in use about seven months. The Buick people have not made a personal visit to find out how this is doing, but by 'phone and letter they admit to the best satisfaction. The Mitchell agency stated that they had no cars in the laundry business in Philadelphia or vicinity, but had a couple of live prospects. They consider this a difficult business to sell in on account of the lack of ready money.

The Reo agency has no cars in the laundry business in and around Philadelphia and none in sight.

Sales Made to Large Laundries

The White agency has no cars in the laundry business in and around Philadelphia, but gave instances of several in Massachusetts, in Baltimore and in the West. This firm has never gone after the laundry business very strongly, believing that the price of the car as compared with Brush, Ford and similar cars of low price would make sales extremely difficult, ready money being lacking in the laundry business. The sales which have been made are to large laundries and are higher capacity vehicles than the ordinary 5000-pound laundry wagon.

The General Vehicle Company has some vehicles in Hoboken laundries, and is making efforts to secure orders from big laundries handling steamship work. The Ford Company have supplied commercial vehicles to laundries. The Buick Company have done very little in the laundry line in Philadelphia, having only one car in use by a laundry in that city, but they consider Philadelphia a good field.

The laundry delivery field is a very wide one for makers, but some care is needed as to the way of approach. Many laundrymen are antagonistic to the motor vehicle, on account of the large number of stops it is necessary to make on each journey. This point, however, can be overcome, and, as has been shown from actual examples, the motor vehicle can be used in the laundry business on a paying and satisfactory basis.

Electric Truck Sales

Sales Effected by Some of the Leading Manufacturers of Electrics During Last Month

An upward tendency is evident in the market for the electric vehicle in all parts of the country, and a significant fact is that a large number of vehicles has been sold as a result of reorders.

MANUFACTURERS of electric vehicles have been alive during the past month, and this fact is evidenced by the details we give of the principal sales that have been made during that period by some of the leading makers.

The Argo Electric Vehicle Co., Saginaw, Mich., have been marketing their product since February, and naturally find each month considerably better than the previous month. Their cars are making a big hit, and from indications they judge that the electric vehicle is going to experience a wonderful progress in the course of the next few months.

They are only making electric trucks in 1000 and 2000-pound jobs, and the majority of these have been sold with the open express bodies, although, of course, there is considerable demand for the closed vehicles. An ambulance was delivered during the past month to Alliance, Ohio.

The period of May 15th to June 15th brought orders to the General Vehicle Co., New York, principally from brewers, express companies, wholesale grocers and department stores. All their large sales were in the nature of reorders, the principal of which were Lembeck & Betz Brewing Co., Jersey City, 5 5-ton trucks; Adams Express Company 25 2-tons and 17 special 1-ton G. V. trucks, making a total of 129 to date; Acker, Merrall & Condit, 4 3½-ton trucks; Arnold, Constable, 2 1-ton trucks. The above sales exceeded a period from April 15th to May 15th in number of vehicles sold, but the April sales showed larger capacities.

The Baker Motor Vehicle Co., Cleveland, O., considers, in general, that the outlook is very bright, and business seems on the increase. Very encouraging progress is reported in the sales of 1-ton trucks to all forms of delivery work, such as department stores, express companies and dairies.

With the Couple-Gear Freight-Wheel Co., Grand Rapids, Mich., the tendency for the past month as well as for the past six months has been strong toward the use of the battery-driven vehicle. The last month especially was a very pleasing one to the firm as it entered orders for two of the battery-driven machines from one of the largest haulers of freight and express in the United States, which starts them to using the battery. They have heretofore used gasoline with unsatisfactory results.

Repeat orders amounting to something over one dozen machines, all of the battery-driven type, were also received, which leads the firm to feel that the battery type of machine is gradually being appreciated by those who have heavy work to do.

The activity in the electric vehicle trade for the past month has been pronounced with the Anderson Electric Car Co., Detroit, Mich., and there have been several orders of consequence placed with the firm. The majority of their business has been in the nature of re-orders.

For instance, the Patterson Transfer Company ordered more vehicles—one of 1½-ton capacity and the other of 3-ton capacity. The Evening News Association ordered 2 more vehicles, bringing their installation up to 10.

Truck's Legal Status

Motor Truck Has Same Rights on Roads as Horse or Any Other Type of Vehicle

No Vehicle, Whether Propelled by Power or Drawn by a Horse, Possesses the Right to Block the Public Highway, or to Run or Stay Unreasonably in the Path of Traffic.

THE substitution of motor for animal power for the purpose of transporting freight through the public avenues of travel has called for a definition of the relative rights and duties of each class of vehicles in respect to the use of the public roads and highways. At the time the motor truck first appeared on the public thoroughfares many of those using horses were antagonistic to the power-propelled commercial vehicle, mainly because horses took fright at the horseless truck, and the question naturally arose as to the rights of a motor truck in using streets and roads which heretofore had been used exclusively by horses. There were those radical and narrow enough to say that the owner of a motor truck had no right to use the highway, that the public avenues of travel were made for horses and that this new means of transportation constituted a nuisance which should be abolished.

But the courts stepped in and commenced to say things and to hand down judicial utterances regarding the relative rights of the two classes of vehicles, and judges all over the country declared that the rights of each class in the use of the highway were equal. In a leading case decided by the Supreme Court of Indiana, it was declared by the court:

> "In all human activities the law keeps up with improvement and progress brought about by discovery and invention, and, in respect to highways, if the introduction of a new contrivance for transportation purposes, conducted with due care, is met with inconvenience and even incidental injury to those using ordinary modes, there can be no recovery, provided the contrivance is compatible with the general use and safety of the road."—See Indiana Springs Co. vs. Brown, 165 Ind. 465, 74 N. E. 615, 1 L. R. A. (N. S.) 238.

So the motor truck possesses the same right to use the highway as any other truck and the same privileges in the use of the avenues of travel. It was attempted to have the motor vehicle declared a nuisance without success, and it was further sought to have it judicially stamped as a dangerous machine or agency, thereby making the proprietor liable for merely allowing the truck to appear in public. The contention was made that it should be put in the same class as dynamite, vicious animals, etc. The Supreme Court of Georgia in refusing this contention, said:

> "It is insisted in the argument that automobiles are to be classed with ferocious animals, and that the law relating to the duty of the owners of such animals is to be applied. It is not the ferocity of the automobile that is to be feared, but the ferocity of those who drive them. While by reason of the rate of pay allotted to the judges of this State, few, if any, have ever owned one of these machines, yet some of them have occasionally ridden in them, thereby acquiring some knowledge of them; and we have, therefore, found out . . . they are not to be classed with bad dogs, vicious bulls, evil disposed mules and the like."—Lewis vs. Amorous, 3 Ga. App. 250, 59 S. E. 338.

The Supreme Court of New York, Appellate Division, also has declared that a motor vehicle is not a dangerous device. The court said:

> "It is no more dangerous than a team of horses and a carriage, or a gun, or a sail boat or a motor launch."

Again, the Supreme Court of New Hampshire declared:

> "There is nothing inherently dangerous in an automobile any more than about an axe. Both are harmless so long as no one attempts to use them, and both are likely to injure those who come in contact with them when they are used for the purpose for which they were intended."

The right to use the public highways having been settled in favor of the power-propelled vehicle, next questions arose regarding what the motor-vehicle driver could do and could not do in the manner of driving. He was legally on the road, not to stand still, but to move. How should he navigate his vehicle? Why, just the same as the horse driver, except that he should stop if he found that his car was causing fright to a horse. Common prudence and the statutory requirements require the driver of a motor truck to bring his vehicle to a stop if by proceeding he might cause injury to a horse-drawn vehicle, or its occupants. But the same rule of prudence requires the horse-vehicle driver to exercise due and reasonable care for his own safety. He should not leave his horse standing unattended and not tied, with the knowledge that his horse might take fright.

Aside from stopping for a frightened horse, the driver of a motor truck has no more duties, and as many rights, as the horse driver. The rights of each in the use of the highway are equal.

No vehicle, whether propelled by power or drawn by a horse, possesses the right to block the public highway or to unreasonably run and stay in the path of traffic. Frequently horsemen will refuse to turn out and permit a motor vehicle to pass. Such conduct is unwarranted and is illegal, as it is the legal duty of a preceding vehicle to give up part of the roadway to an overtaking vehicle. Much crowding is due to the failure of drivers to turn out, and many collisions are caused thereby. As the motor truck is generally the overtaking vehicle on account of its great power and as compared with the horse truck, drivers of the latter class of vehicle often have been guilty of obstructing the path of travel, and great cause of complaint has existed in the past.

There are also certain rights which motor and horse trucks have in respect to the condition of the highway, and these rights are equal. Municipalities and other local bodies having charge of the improvement and repair of roads and streets are compelled to keep the highways free from obstructions which might cause injury. Also, wherever there are declivities in the sides of approaches to a bridge, adequate fences or rails should be erected, and of sufficient strength to prevent the truck from running off the road should the driver lose control while exercising due care. Again, the streets of a municipality should be free from dangerous holes or depressions. The shock produced by these is much greater to a loaded motor truck having small wheels and propelled from the rear than it is to a horse vehicle with large wheels and which is hauled along. There are, therefore, cases in which a municipality may be held liable for injuries caused to motor trucks because of defects in a highway, and under the same circumstances no liability would exist if the vehicle was a horse-drawn conveyance.

ONE of the interesting activities of the electric vehicle interests in Boston is the establishment of what has been designated the Electric Farm, at which the Boston Edison Company is demonstrating the many uses of electricity. Just now the farm is at South Framingham, Mass., on the old Middlesex fair grounds, but it will be moved about from place to place until all the territory is covered.

The equipment of the electric farm consists of two trucks, a Walker and a G. M. C., two big tents and about fifty appliances, such as milking machine, cider mill, corn sheller, ensilage cutter, feed grinder, wood saw, hay hoist, pumps, churns, bottle washers, etc. By means of the trucks the farm is transported to its temporary site and the appliances set up within the tent for demonstration. One of the trucks has a portable power plant and wire, so that work may be done with electricity on any part of a farm where the lines of the Edison company are convenient.

When the farm gets ready to move the entire outfit is packed on the trucks and taken across country to the next stopping place.

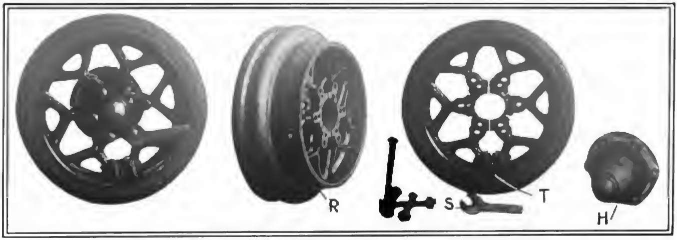


Fig. 1—The Shepherd Cast-Steel Wheel in General Use by the London Omnibus Co.

English Tire Wear

Many Examples of High Mileage—Anti-Skid Devices Not Used—Demountability Wins

Part IV

LONDON, June 10—It is difficult to obtain from big concerns operating trucks in this city the tire cost of such. With the big 'bus companies, where the vehicles are kept tired on contract with tire companies, it is impossible to get any cost figures. Many private concerns give out occasionally their tire cost and several examples of these follow: A 500-pound Star delivery wagon, Fig. 4, has a tire cost of but .42 cents per mile, less than ½ cent, a remarkable tire cost figure. A 1,500-pound Belsize wagon costs but 5.4 cents per mile, a fraction over ½ cent. A fleet of similar makes of 2,000-pound vehicles have cost 1.1 cents per mile for a period covering several months; in fact, over a year. Another example of the cost of tires on a ton vehicle is that of a Lacre chain-driven truck costing 1.6 cents per mile. Harrods, one of the big west-end dry goods merchants, use many wagons of from 1 to 2-tons capacity at a tire cost which ranges from .96 to 1.26 cents per car mile. Another concern in similar business operates a line of 2-ton machines at a tire outlay of 1.83 cents per mile. Leyland trucks used in the mail service cost 1.56 cents per mile for tires for 1.5-ton trucks, and 5 to 6-ton trucks of this make in brewery service cost 4.96 cents per mile, Fig. 2. In their 3.5-ton trucks in brewery service the tire cost is 3.36 cents per mile.

All of these examples of tire cost are for comparatively long-chassis vehicles with motors under the bonnets. It is generally taken that one of the results of having the motor under the footboards is to put so much extra weight on the front tires, as well as tending to drive them into the road, instead of along it, that they either wear out or give out sooner. There is a belief that properly proportioned live-axle trucks and wagons are lighter on tires than chain-driven machines, mainly owing to the gentle take-up of the drive.

One of the features of the use of solid rubber tires in Europe, and which may astonish many truck owners in America, is the fact that non-skids or grips are never used on either buses or freight trucks here. Of course bad roads and more severe winters may stimulate their use in the States for a while, but on the other hand, many of our heavy steam trucks are fitted with plain solid rubber tires during the winter months so that they may continue in service regularly, otherwise the steel tires on which they run for 9 months in the year might render them useless, as the hard surface they present will not bite on frosty granite or frosty anything for that matter, while rubber tires grip well here.

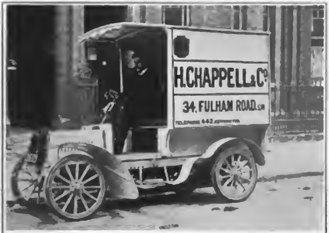
Of the many demountable devices for single and dual tires, which have appeared on the market, two only have survived to any extent, the first being in respect to solid tires, Challiner's patent, made and marketed by the Shrewsbury &

Fig. 2—Five-Ton Brewery Trucks Cost 4.96 Cents Per Mile for Tires and 3.5-Ton Trucks of Same Make 3.62 Cents Per Mile.

Fig. 3—National Steam Buses Cost 3.22 Cents Per Mile for Tires

Challiner Tire Co., Ltd., Manchester. Fig. 6 illustrates it as applied to either single or dual rubbers. From this it will be seen that the arrangement simply consists of a steel wedge liner W fitted between the steel foundation band B and the bevelled binding band C of the wheel. The tire is simply put round the wheel and the wedge liner driven in between the steel foundation of the tire and the bevelled binding tire of the wheel: the fixing is by a band A secured by cross bolts and nuts.

The principal field for this demountable device is where the tire has to be taken off or put on when a press, hydraulic or otherwise, is not available. To dismount the tire, the wedge liner W may be driven out by the application of a cold chisel, but if the various bands beneath the tire become rusty and are immovable, the only remedy is to saw the tire right through, the necessity for this has, however, not happened up to the present.



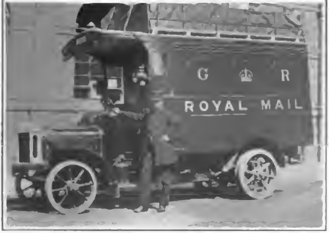


Fig. 4—A 500-Pound Delivery that Costs .42 Cent, or Not ½ Cent Per Mile for Solid Rubber Tires.

Fig. 5—A 1.5-Ton Royal Mail Wagon Costing 1.56 Cents Per Mile for Tires

Fig. 1 is a photographic reproduction of the complete cast-steel Star wheel as used by the London General Omnibus Co., Ltd. It finds a ready market among users and manufacturers of commercial cars. It is known as the Shepherd.

In construction the Shepherd steel wheel is extremely simple. The central portion, which is bored out and tapered to take the back hub, is split between each pair of spokes, while the outer rim R is also split at one point, but has a right and left-handed screw connection T with lock nuts fitted for the purpose of expanding or contracting the wheel. The hub consists of one steel casting H tapered to fit the wheel and having a flange on one side cast with bosses which are drilled to correspond with the bolt holes on the spokes. When the hub is in position bolts are inserted through the spokes and the bosses on the hub so that the full strength of the spokes is practically restored, although the metal is split between each pair, as above described. The drive from the hub to the wheel is taken by one or more keys on the former fitting into corresponding keyways in the latter.

The method of attaching or detaching the Shepherd wheel is by no means a complicated matter and can be readily understood by reference to the illustrations appended. To remove the wheel from the hub all that is necessary is to unscrew the nuts off the hub bolts and to insert two or more set screws in the smaller tapped holes which, as shown, are next to the bolt holes in the spokes, but nearer the center. By screwing the set screws hard down the wheel is forced off the tapered portion of the hub.

The removal or replacement of the tires is equally simple. The wheel is first detached from the hub and the ring contracted by means of the right and left-handed screw device. The tire may then be removed or replaced, whichever the case may be; if the latter, the wheel is then expanded sufficiently to keep the tire in place. This arrangement obviates the use of any elaborate appliance for the dismounting of the tires and renders their removal and replacement a simple roadside job. The Shepherd system of wheel construction can be utilized on any type of steel wheel and, it is stated, adds but little to the cost of manufacture. It might be thought that the distortion caused by expanding the wheel in order to grip the tire band, especially if the latter happens to be of large diameter, would be a serious objection. We understand, however, that due consideration has been given to this point and that the rims of all Shepherd wheels are to be turned so as to be equal in diameter, when in their normal condition, to the average standard sizes of the band tires for which the wheels are intended. It is generally known that, owing to various reasons, manufacturers of solid band tires cannot guarantee their rims to be within 1.32 inches and 1.64 inches of the correct size. However, the wheel expansion or contraction will not affect their strength.

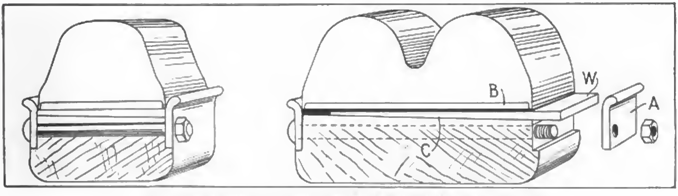
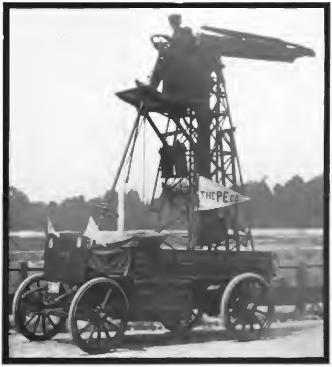


Fig. 6—Challiner Edge Type Demountable Rim Suitable for Single or Dual Type



Wagon in Philadelphia Parade for Renewing Carbons in Electric Arc Lights. The Driver Can Steer from Above or Below

Parades Are Popular

Philadelphia, Boston and London Set High Standards of Usefulness and Introduce Demonstrations and Exhibitions

PARADES are becoming important factors in the motor truck field. The last few weeks has witnessed important parades of privately owned trucks in Philadelphia, Boston and other cities, and London has only recently held its big annual parade. The parade of motor trucks was held a few years ago as an enthusiasm producer by the truck agent. He generally borrowed all of the trucks he could from the business people, and after decking them out in banners and bunting paraded them around the business streets. It was more or less of a moving circus scheme. To-day this spectacle has ceased, and like other parts of the truck business it is now getting down to a business basis. Philadelphia, in its parade in the middle of June, set a high mark in this respect. The parade was made up of 509 motor trucks and delivery wagons representing seventy-one different makes of vehicles.

But the Philadelphia Automobile Trade Association made more than a mere parade out of it by combining a demonstration scheme, whereby citizens not at present owners of trucks but interested in them, had an opportunity of looking over the various vehicles to determine which of them was most suitable for their particular needs. In this way the practical was combined with the spectacular. There is not any reason why this idea cannot be carried further and the parade made a big occasion. In London the annual parade of motor trucks is on a bank holiday so that the financial interests have a chance of observing first handed the magnitude and versatility of the truck field. This is an excellent idea and one that can be imitated with success. The business man must be interested, and if he will not stand on the sidewalk and watch a parade he will go to some park or concourse where every facility is offered for demonstrating the various vehicles and exhibiting them.

The Philadelphia Truck Parade

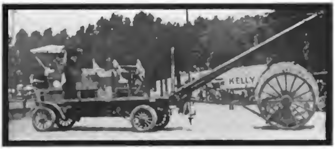
Novelties in Philadelphia Parade

In the Philadelphia parade every type of truck from 500-lb. delivery wagon to the 15,000-lb. vehicles was represented. For the conveniences of the participants and also the exhibitors the vehicles were divided into five divisions: No. 1, trucks of 7000 pounds' capacity and over; No. 2, trucks of over 4000 pounds and under 7000; No. 3, trucks of 2100 to 3900 pounds; No. 4, trucks of 2000 pounds and under, and No. 5, electric trucks irrespective of load-carrying capacity. It was the first division that best exemplified the varied uses of the motor truck.

One of the interesting small vehicles was that of the Society for Prevention of Cruelty to Animals. During the hot weather this little vehicle traverses the sections of the city in which there are not any watering troughs and furnishes free water for drivers and horses. It was installed last year and traveled 1343 miles and watered 44,854 horses. During the parade last year of the work horses of the city it was in service and watered 860 horses and 240 persons. The parade was free from the charging of entry money or the awarding of prizes, and of the total cars in line, 235, or over half, went to the Belmont Driving Park, where the vehicles were exhibited to the business public.

These Two Illustrations Give a Good Conception of the Zest with which the London Merchants Entered the Big Motor Parade on May 27

General View of Philadelphia Parade



Telephone and Post Hole Digging Truck

It has been the custom in Boston for many years to have a parade of work horses on Memorial Day. Curried and combed and decked out with brightly polished harnesses and ribbons, the stanch truck horses of the prominent business houses of the city have annually been driven through the streets, and prizes have been awarded to the horses, which they proudly wore for the ensuing year attached to their collars. And the drivers also have been given prizes.

It was a sign of the times that a year ago the dealers in electrical commercial motor vehicles got together, and just to show that there was something else capable of hauling the city's freight besides horses, held a parade. They drove their trucks through some of the downtown streets and the parade excited considerable comment. Though there were only about sixty vehicles in the line that followed the band wagon, much surprise was expressed by business men that there were so many electric trucks in the city.

But this year the parade of electric trucks on Memorial Day was a formidable competitor in popular favor with the work horses, and the showing of vehicles caused many to express even greater surprise at the tremendous growth of the past year. There were 131 vehicles in line, every one of them propelled by electricity, and of the total 122 were commercial vehicles ranging all the way from a small delivery wagon up to big five-ton trucks.

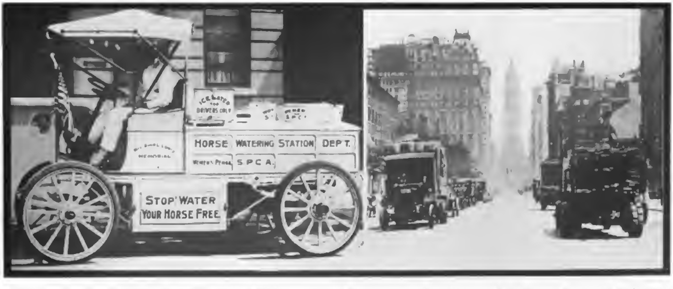
The parade was under the direction of the Electric Vehicle Club of Boston. The biggest display was made by the Edison Electric Co. with thirty-five vehicles in line. The Ward-Corby Company, bakers, had sixteen in line; General Electric Co., East Boston, nine, and there were many other exhibitors who brought along three or four trucks, and others with single trucks.

Under the auspices of the Commercial Motor Users' Association, a big parade of commercial cars was successfully held on May 27, on the Thames Embankment, the function being the sixth of its kind.

The London parade is an annual event which grows in interest, and in the variety of types of commercial vehicles exhibited, every year. Special prominence is made of the exhibition of fleets of vehicles used in some special service, and it is remarkable what a fine appearance these possess, garnished and swept, so to speak, with holiday cleanliness. The British business public is keenly interested in the development of motor traction, and day by day the number of motor vehicles on the streets of London becomes greater. The streets in the city are specially fine for such means of delivery.

Features of the London Annual Parade

Prizes were awarded to drivers and engineers in charge of fleets exhibited on this parade, mainly in consideration of the mileage the respective vehicles had done in a certain time, and further having regard to the condition of the wearing parts after such mileage. Naturally, with the rapidly growing use of the business car in all classes of transport, it was well attended, in view, no doubt, of the fact that some of the single prizes awarded to drivers reached $50, and some 300 machines were paraded. Judging had been all done beforehand, as it would be impossible to accomplish such a feat in a public thoroughfare where such a number of vehicles were concerned, and by noon about $1300 in prize money had been distributed. Of this sum the Society of Motor Manufacturers and traders contributed no less than $787.50 and between 30 and 40 firms contributed most of the remainder. Owing to the large following of steam trucks in England, this type of vehicle carried off first and second prizes. Steam trucks have in England a greater number of supporters than in any other country.


ICE WATER FOR DRIVERS ONLY
HORSE WATERING STATION DEPT.
S P C A.
STOP' WATER YOUR HORSE FREE

One of the Most Interesting Vehicles in the Philadelphia Parade Was the Free Water Wagon of the Society for Prevention of Cruelty to Animals. General View of Parade with City Hall in Background

The Editor's Viewpoint

The Annual Model

THROUGHOUT the truck makers there is a general tendency to keep away from annual models, consequently buyers who are looking for announcements of 1913 models during the coming autumn will meet with many disappointments. Many makers are decidedly adverse to the annual model on the ground that it may be interpreted by the buyer as being an indication of lack of completeness in the present state of the industry. On the other hand, many companies are going to refrain from the annual models because their present models have given the anticipated satisfaction and there is little necessity for alterations.

In a general canvass of the truck field the prevailing sentiment is to bring out new models when demand requires it and not be bound by the annual cycle. The business man has learned that in every machinery field improvements are made from time to time, and that these are not necessarily made at the end of the fiscal year. It is customary with machinery houses to make such changes and to charge an additional price for the improvements in case any owner of an older type of machine wants to have the improvement incorporated in it. This course may be evolved in the truck field. If the clutch in a 1912 model is not considered entirely satisfactory it can be improved and the new type substituted for the older ones without bringing out a new chassis.

One of the biggest factors in continuing satisfactory chassis types is that it simplifies truck maintenance. The business house that expects to install forty or fifty trucks would have to install quite an elaborate supply system if a new model were being brought out each year. The business man requiring such a fleet of trucks would soon find himself entangled with an intricate problem, much the same as does the business man to-day who has purchased a dozen different makes of vehicles and then finds that he has to get his repair department familiar with every one of these and, in addition, that he must carry spare parts for a score of vehicles instead of for one or two. But the problem goes further in that he has to deal with a score of different factories. Each factory has its own particular service-and-spare-parts system, and the truck owner must not only become familiar with each, but must operate in accordance with them. Where annual models are brought out the repair-and-spare-parts question becomes almost as involved as where a score of different makes of vehicles are used. Consequently not a few makers are taking the wise course when they announce that they are taking precaution in every possible way to avoid changing their present vehicles, and it is not a wide leap of the imagination to see that some makers will continue their truck models for 3 or perhaps 4 or 5 years with scarcely a change. Changes are always significant of original weakness, and in a new industry the first and foremost requisite is a fundamental basis of solid strength; this should be fostered, not changed.

Horse-Pace Methods

THE introduction of the commercial motor vehicle has resulted in the discovery that many present systems of handling merchandise in industrial plants are based on horse-pace and that every effort simply to substitute motor vehicles for horse-drawn vehicles without altering the system of handling will not give that efficiency which the motor vehicle is capable of giving and which it must give before the last word has been said in its behalf.

Many striking examples of horse-pace exist. There are scores of industrial plants being erected at present in which the elevator capacity is not adequate for motor vehicle service. In laundries one freight elevator is in many cases being used to take the clothing from floor to floor in its travel from the ground floor to the top one, where it arrives in its finished form and from whence it must be brought down in the same elevator. The service on such an elevator is unpardonably slow; in fact a horse wagon often waits for over an hour before the load is finally in place. But the laundryman has not objected to this; his horses had to be rested, and there was not a better place than beside the plant.

But when these laundries begin the installation of motor vehicles and the displacing of horses a new régime sets in, and, instead of the horse waiting, there is the motor truck waiting. It costs money to keep a motor truck waiting, much more money than to keep a horse waiting, and in addition there is not any necessity for a motor truck to rest the same as there is for a horse. The net result is that the motor vehicle is operating at very low efficiency as compared with its possibilities and not a bit of it is due to any inherent defects in its design or manufacture. The trouble is simply that it is compelled to operate at horse pace because the building is a horse-pace building, and until more adequate elevator service can be installed it is impossible to better the conditions.

There are many such horse-pace buildings throughout the country and they are not all old-fashioned buildings; rather, some of them are eight and ten-story reinforced cement constructions that have been erected within the last year or so. But it is still worse in that the building construction people are continuing to erect horse-pace buildings and will keep on doing so until they are shown the error of their ways.

It is to-day imperative on motor vehicle companies, on motor vehicle dealers and motor truck clubs and trade organizations, to present properly these conditions to the building construction companies, to industrial houses now erecting new plants and who will be users of motor vehicles within a year or so. It is the duty of the truck interests to present properly the case to the architects who have such work in charge; it is their duty to present it to building commissioners, so that in addition to busying themselves on fireproof features, proper lighting and ventilation they will also take up vigorously the matter of adequate facilities for the receiving and disposing of merchandise and general freight.

The subject of adequate receiving and shipping facilities for different types of buildings is already being investigated in one of our biggest cities. The matter was taken up by the police on the suggestion of the COMMERCIAL VEHICLE. The police were quick to see that alley congestion was largely due to lack of receiving and shipping facilities at the rear of the big buildings. Express wagons were congesting alleys for hours, the majority of the time being due to waiting to reach the loading platform. Not only were express wagons violators, but practically all kinds of vehicles were equally guilty. The result is that ways and means are being discussed with the hope of improving the facilities, and if immediate improvement cannot be accomplished in the old buildings it is to be hoped that precautions will be taken in connection with each new building that is being erected.

The manufacturers of endless conveyers are coming to the rescue of the motor truck and also the horse-pace building. Already several concerns, who have discovered the inadequate accommodation of their freight elevator service, have installed endless conveyers for carrying merchandise from the ground to the top of the building and back again. These conveyers occupy little space and it is very frequently possible to install them in buildings where the installation of an additional freight elevator would be impossible. These endless conveyers are much quicker than freight elevators and have other advantages.

But it is a certainty that the introduction of the endless conveyer will not end with the inside of the building; there is not any reason why it cannot be used for loading and unloading. With the endless conveyer properly designed and fitted, the materials can be brought from the basement or any of the floors above ground and deposited right in the truck body. This is being done in one or two cases at the present time. Using the endless conveyer in this field, along with its more general adoption in the inside of the building, there is not the slightest reason why the performances of motor vehicles can be enormously increased.

The endless conveyer has been anticipated in the loading field by the chute, now in use for loading from a second floor, and often from a third floor. The canvas chute is at its upper end secured to a framework in a window and the lower end attached to the truck body. The parcels are slid down right into the body, and the constant passenger traffic on the sidewalk beneath is not molested in the slightest. By such economic means there is vast reduction in labor and an equally great reduction in time.

How to View Insurance

When purchasing a motor vehicle, or a fleet of trucks, one of the points often quite ignored in the mind of the buyer is the question of insurance. He very rarely stops to consider whether the payment of insurance premiums will effect the paying utility of his vehicles. He buys the trucks and figures out the insurance costs afterward.

Insurance rates are high, and the consideration of the subject involves the calculation of big figures. Insurance is a vital matter, just as important as repair and operating expenses, and certainly the most important of the fixed charges incidental to the upkeep of a motor truck. Consequently it should be one of the foremost points to receive the attention of the purchaser. According to the town or city in which the truck is to operate so will the insurance rates vary, and quite as much are they dependent on the special service for which the truck is bought.

People always object to paying out money when there is a chance of it never being repaid. Some men consider the payment of insurance premiums as a voluntary charity to rich corporations. But do they always consider the moral effect that the payment of insurance premiums has on one's mind? Safeguards are worth purchasing, even if they are invisible, and although accidents may never be forthcoming, there is a sense of security behind the protecting wall of an insurance policy that fosters clearness of vision by way of freedom from unnecessary worry. A man without insurance on his trucks is forever in a maze of wondering whether or not his trucks will suffer from tempestuous drivers or blind pedestrians. He may seek to drown the thought by building up an emergency fund in case of accident, and buoy himself up with the comfortable thought that if he is favored by fortune that fund will serve to mitigate the expenses of the ensuing year. Yet emergency funds are soon lost in the all-devouring whirlpool of liability indemnity. The most careful driver cannot avoid people who persist in running into his truck. The most ingratiating man cannot persuade an uninjured person from trying his luck in the courts and appealing for compensation for wrongs done to his internal system.

The other side of the question must, however, be considered. Insurance rates are undoubtedly high, and a man can only be called a fool who pays premiums for every kind of insurance without the smallest particle of consideration as to the advisability of taking out each policy. A man's mental attitude toward the fear of accident is a big factor in the choice between insuring and not insuring. His past experience may have proved to him the folly of paying out large sums each year to insure himself against accidents that persist in treating him with disdain, keeping away from the territory in whch his vehicles operate.

Insurance must be left entirely to personal judgment, and personal judgment must be founded on an analysis of conditions and costs. Above all, find out everything about truck insurance and make an exceedingly careful and exhaustive study of the terms of the policy. The insurance company's offices should not be gone into blindfolded. It is the duty of the insurance agent to sell, and naturally he will have a splendid series of arguments as to why such-and-such policies should be taken. But the truck owner, if he has studied the subject, should listen to those arguments, and go away. He will then weigh the pros and cons in each separate case, and form his opinion on his own knowledge of the special conditions that will affect the truck he is operating and the general conditions which have been related to him by the insurance agent. The question should be examined through a microscope revealing balances in the scales of which are placed the possibilities of mischance to the truck and the favorable conditions afforded by work done by the truck, driver, and the district of operation. Only after such careful analysis can a correct idea be formed on the subject. Any time spent on such analysis by a truck-owner is amply repaid.

Loss on Motor Buses

Fifth Avenue Coach Company Shows Large Deficit for Last Year—Over 6,000,000 Persons Carried

Company uses eighty buses on various New York streets, each bus averaging 7.2 miles per hour. Wear and tear $2.21 per bus per day. Tire costs over 10 per cent. of gross receipts.

INTERESTING information on the cost of transportation in New York by motor bus is contained in the latest report for 1911, just issued by the Public Service Commission. The figures show that the Fifth Avenue Coach Co., operating a fleet of eighty buses, fifty-four of which are in average service, showed a deficit of $38,820.89 for the year. The gross receipts of the buses during the period was 47.08 cents per bus mile, or 1.36 cent for bus-seat per mile. During the year they carried 6,305,175 passengers, making 153,602 round trips from Washington Square North on Fifth avenue, with branch trips to Riverside and many other points. Each bus averaged forty-one passengers for the round trip of 19 miles, the daily bus receipts amounting to $30.95 per day. During this period fifty-four of the eighty buses were in active service, the remaining twenty-six being idle, in reserve, or undergoing repairs. As the blocks in New York run twenty to the mile along most of the route, this means that a new passenger was taken on every four blocks.

The daily earnings of the line amounted to $1652.54. The fifty-four buses in active service made each 2844 round trips a year, or 7.7 round trips per day. The average number of hours a bus is in service during the year is 2222, or 6.1 hours per day. This applies to the eighty. Each bus in active service, that is, each of the fifty-four, averages 23,716 miles in a year, which is 64.9 miles a day, or 7.2 miles an hour. The average number of hours that the fifty-four buses in active service travel in a year is 3293, or 9.01 hours per day, making 64.9 miles, or the average of 7.2 miles per hour in service.

The number of passengers carried in each bus is limited to the seating capacity, thirty-five, and no one is allowed to stand in aisles or on platforms, except where a passenger has been deprived of his seat after paying his fare. Children in the arms of adults are carried free. Hand baggage is also carried free.

The buses are double-deckers and in spite of their average speed being equal to that of a trotting horse their operation is remarkably free from accidents, only five persons being struck in 1911, of whom three were killed. Twenty-five were injured in other ways, chiefly in alighting and boarding the vehicles. In 1910 the company paid out for accidents to persons and property $39,996.03, made up of $3999.59 property damage and $35,996.44 personal injury. During 1911 fifty-one damage suits were filed and twenty-three suits for claims and damages filed up to June 20, 1911. Fifty-four were settled up to this date and thirty remained unsettled at that time.

Wear and tear is an important item in the cost of maintenance, partly due to the heavy weight of the vehicles and height. At present it amounts to $2.21 per day per bus. This is figuring the total number of buses in service, eighty in all, but as an average of only fifty-four buses are in service the daily tire cost for actual service is $3.43 per bus.

The tire cost for the year amounts to $67,563.96, or $844.55 for each of the eighty buses. Any appreciable saving in this respect would be an important item, for as the gross receipts of a bus average $30.59 per day, it will be seen that the tire expense is more than 10 per cent. of the gross receipts.

The buses weigh 9500 pounds and the passenger floor is as high, if not higher, than that of the ordinary trolley car. It is plain that by lowering the passenger floor and thus the entire height of the vehicle, two feet in height could be saved. The present life of the bus is placed at three years, and the cost estimated at $5400.

The company employs 277 men, of which eighty are conductors, eighty drivers and 115 are in the garages. The wages amounted to $218,326.03 last year.

Two repair shops are maintained, the principal one being located at the main garage, Eighty-eighth to Eighty-ninth street, between Park and Lexington avenues. This main shop is equipped with three lathes, two grinding machines, two planers, a milling machine and a shaper, and two drill presses, besides other small machinery necessary in making repairs.

Of the 115 men employed outside of the men conducting the traffic, twelve are cleaners. A large number of the men are engaged in overhauling the buses, as they are repainted and gone over thoroughly once a year.

The location of the main shop and garage is placed at a favorable point, about midway of the routes of traffic. The smaller repair shop is near the lower end of the line.

The routes of the company are mainly up Fifth avenue, branching off into four great stems and penetrating the most desirable and interesting residential parts of the city.

The buses are greatly favored by visitors to the city, as the routes by which the buses travel enable them to obtain a very good idea of the city.

There are ten routes at present, no new ones being added during the past year. The routes are as follows:

1. From Washington square up Fifth Avenue to Ninetieth street.
2. From Washington square up Fifth avenue to Fifty-seventh street, where the line crosses to Broadway, goes up Broadway to Seventy-second street, thence across to Riverside Drive to One Hundred and Thirty-fifth street, crossing to Broadway.
3. From Washington square up Fifth avenue to One Hundred and Tenth street, being an extension of Route No. 1. Westward on One Hundred and Tenth street, which is the northern boundary of Central Park, to Riverside drive and thence to One Hundred and Thirty-fifth street and Broadway along the route of No. 2.
4. A limited portion of Route No. 2, up Fifth avenue from Washington square to Fifty-seventh street, thence over to Broadway, up Broadway to Seventy-second street and thence across to a terminal point at Seventy-second street and Riverside drive.
5. From Washington square up Fifth avenue to One Hundred and Twentieth street, thence westward a short distance and up Mount Morris Park West to One Hundred and Twenty-fourth street, back to Fifth avenue and up Fifth avenue to One Hundred and Thirty-fifth street.
6. From Washington square up Fifth avenue to Seventy-second street and eastward to First avenue.
7. From Washington square up Fifth avenue to One Hundred and Tenth Street, west to Seventh avenue, up Seventh avenue to One Hundred and Fifty-third street to Central bridge over the Harlem River, via Macomb's Dam road.
8. From Washington square up Fifth avenue to One Hundred and Tenth street, thence to Central bridge.
9. From Washington square up Fifth avenue to Fifty-seventh street, thence via Broadway to Central Bridge.
10. From Washington square south along South Fifth avenue, now known as West Broadway, to Bleecker street.

The following tabulation gives the principal statistics of the various lines:

	Fifth Ave. and Eastside Routes.	Fifth Ave. and Westside Routes.	Queensboro Bridge Routes.	Other Small Routes.	Total
Passengers carried	2,985,175	2,707,664	549,954	62,382	6,305,175
Fares collected	$298,517.50	$270,766.40	$27,497.70	$6,238.20	$603,019.80
Average number buses per day	23	21	9	1	54
Round trips in 1911	70,132	65,018	15,904	2,555	153,609
Bus miles in 1911	557,316	646,565	56,185	20,598	1,280,664
Bus-seat miles in 1911	18,948,744	21,983,210	1,910,290	700,332	43,542,576
Bus-hours in 1911	82,624	85,164	7,041	3,003	177,832

The number of bus seat miles taken in consideration with the number of passengers carried indicates that it was necessary to carry a seat 6.9 miles for the accommodation of a passenger, the proportion of vacant seats being indicated by the difference between this figure and whatever length of the ride the passengers actually averaged, which of course is not ascertainable:

Depreciation of vehicles	$101,511.53
Wages	218,326.03
Tire renewals	67,563.96
Maintenance and equipment	99,809.62

An itemized statement of the operating expenses for 1910 shows in an interesting way the division of costs among the various departments:

Maintenance	$246,921.23
Superintendence	3,424.32
Repairs of bodies	14,387.98
Repairs of running gear	13,462.75
Repairs of transmission	24,105.94
Repairs of motors	18,083.86
Repairs of buildings and factories	4,288.91
Repairs of shop, tools and machinery	883.52
Tires	55,125.76
Other expenses	574.91
Depreciation of vehicle equipment	112,583.28
Conducting transportation	264,672.70
Superintendency and clerks	4,731.17
Starters, receivers and inspectors	8,819.51
Oilers and washers	7,395.92
Shifters and other garage laborers	6,256.96
Drivers and conductors	115,263.23
Gasoline	37,360.61
Oil and waste	6,744.58
Water	378.90
Light for buses	4,587.82
Light, heat and power	3,006.51
Other garage expenses and supplies	1,393.88
Rent of buildings and property	14,086.12
Damage to property	3,999.59
Damages to persons	35,996.44
Other expenses	14,651.46
General expenses	21,179.71
Salaries, officers, clerks	6,197.88
Insurance	3,490.89
Stationery and printing	783.69
Legal Expenses	7,576.37
Other expenses	2,697.54
Total operating expenses	$532,773.64

The buses are equipped with 35-horsepower DeDion-Bouton motors, four cylinder, vertical, 110 and 130 millimeters bore and stroke.

The company has a legislative franchise which was issued on June 2, 1886, to the New York Transportation Co. This franchise was confirmed in 1900 by legislative action, Chapter 657 of the Laws of 1900.

A license fee of 5 per cent. of the gross receipts is paid to the city for its franchise rights. The company is capitalized at $50,000, and was incorporated in 1886. It has no bonds outstanding and its franchise is perpetual.

The lines are now operated by the Fifth Avenue Coach Co., which has outstanding 30,000 shares of stock, $100 par value, amounting to $3,000,000. On June 10, 1910, all the stock was held by the Metropolitan Street Railway Co., except the director's classified shares. The lines are thus supplementary to the surface railway system.

Sea-to-Sea Delivery

Philadelphia Soap Merchant Delivers Load of Goods By Motor Truck to California in Modern Demon

This journey will constitute the first trans-continental trip with a cargo of such capacity. A special feature of the truck is that the body is constructed entirely of steel.

PHILADELPHIA, June 20—To-day the first transcontinental commercial delivery by motor truck in history of a 3-ton cargo was undertaken when Charles W. Young & Co., of Philadelphia, despatched a consignment of goods to the Carlson Currier Co., Petaluma, Cal., a distance of 4,436 miles. Besides being the first ocean-to-ocean trip with a cargo of such capacity, this delivery will be the longest distance delivery on record. It is expected that the trip will take about 45 days and the route followed is by way of New York, Albany, Buffalo, Cleveland and South Bend to Chicago, and from thence to Davenport, Des Moines, Omaha and Denver. Salt Lake will be reached by the Cheyenne route, and the Southern route followed via Wolcott, Grand Junction and Green River to Renom, and from there to Sacramento, San Francisco and Petaluma.

The truck is an Alco with a capacity of 3½ tons and rated at 40 horsepower. The motqr has 5-inch bore and 6-inch stroke and the truck is capable of an average speed of 12 miles per hour. The weight of the chassis is 6,800 pounds and the weight of the body 1,200 pounds. The latter is of steel, having been made by the Hale & Kilburn Co., and is 800 pounds lighter than its equivalent in wood. The weight of the load is distributed as follows: 33 per cent. on the front wheels and 56 per cent. on the rear wheels. The measurements of the platform are 14 feet by 5 feet 6 inches.

Besides the cargo of soap, the usual equipment of planks, tackle, skidding boards, etc., will be carried. The size of front and rear tires is 36 inches by 5 inches. The truck is being piloted by two drivers.

WESTFIELD, N. Y., June 26.—The transcontinental delivery truck arrived here last night, being strictly within scheduled time. The mileage accomplished yesterday amounted to 136 miles. The journey from Rochester to Buffalo, a distance of 74 miles, took 4 hours and 50 minutes. The truck is due in Chicago on Sunday next, June 30. Its daily schedule has been maintained.

Alco 3½-Ton Truck Owned by Charles W. Young & Co., Now on Transcontinental Trip

Improved Trade Conditions

Steadily Increasing Demand for Motor Trucks in New York and Chicago—Good Sales in the Smaller Cities—Truck Demonstration in New Orleans—Good Conditions in Washington

THE reports from the various cities of America, both large and small, are all showing how widely the motor truck, as a means of transportation, is being adopted. No business firm having the problems of an efficient delivery service can afford to ignore the significant tendency of these reports; makers are turning out more work and customers buying more.

THE sale of motor trucks in the many cities of America during the last half of May and the first two weeks of June has been moderately good. In the large cities there has been increased buying, many of the buyers apparently having finally decided to purchase trucks, after their long period of inaction following the show circuit of last winter. Another factor which has started much buying activity is that the hot weather is approaching, a period which is very expensive for concerns operating many horse vehicles. The heavy death rate during the hot months of 1911 worked a hardship on many concerns, not only due to the actual loss in horses, but also to the enormous inconvenience. These people are guarding against a return of these conditions this year.

In New York city there has been a steadily increasing demand for medium-loading carrying trucks, the majority of the orders being repeat ones, and coming from houses that have been using their other motor vehicles for several years. This is one of the healthiest indications of the trade. It is an object lesson to every thinking buyer when he sees a company that has been using motor trucks for several seasons increase their fleets of vehicles.

What has happened in New York has also happened in Chicago. Repeat orders have been the rule, and many new sales have been made to companies that have been studying the truck field for a season or two.

In smaller outlying cities there has been a healthy sale of different types of vehicles, the low and medium-load carrying class leading. The increased sales in these cities has to a large extent been due to the new agents that have been established all over the country. The last six months has seen hundreds of new truck agencies arranged for, and it is but natural that there should be a relatively good showing made by them. This is not to be interpreted as transitory, but the forerunner of a steady trade.

Truck Used to Relieve Flood Sufferers

BATON ROUGE, LA., July 1.—Unstinted praise has come from all sides for the work of an Alco motor truck in rushing food to flood sufferers. With the flooding of vast sections of country above this city the refugees were forced to flee southward and were formed in camps above Baton Rouge. In many cases the need for supplies was very urgent, and the rapid service of the motor-driven vehicle saved much suffering, if not actual loss of life. Despite the bad road conditions, the truck always managed to plow its way through.

A Good Month in Columbus

COLUMBUS, O., July 1.—The past month has been a good one in every respect in the motor truck business in Columbus and central Ohio. Practically all of the local motor truck agencies report a larger number of inquiries than ever before, and sales are proportionately larger. Inquiries for trucks for the hauling of bricks, for the use of general contracts, for the general transfer and storage companies and in delivery lines were received daily.

One of the best features of the market during the past month is the fact that general business conditions in central Ohio have improved materially. This is reported in spite of the great political agitation which has been going on. After the conventions of the political parties are over a still further improvement in industrial conditions is anticipated.

Minneapolis Looking Up

MINNEAPOLIS, MINN., July 1.—Trade in motor trucks for the four weeks ending June 15 averages a little better than the same period last year, according to the summary of reports of the various truck dealers. In some quarters the sale is found better for the 1½-ton machine and under. A few of the manufacturers and dealers find the sale averages 1½-ton trucks. G. D. Wilcox of the H. E. Wilcox Motor Car Co., says that the business for his organization runs about 20 per cent. better than last year. The Robinson-Loomis Co. reports its first business to outside points this year, especially with the Gopher truck, which it manufactures. The 2-ton truck is the most recent favorite in this line. Two trucks have just been delivered in Montana, at Waverley, Minn., and Winnipeg, Man., respectively. Clarence Haviland, of the White Co., says that business for the month is better with his company than last year. The trucks asked for principally are those of 1½ ton capacity. One-third of the business is outside the city, to points as far west as Montana. None of the dealers reports much farm business, but trade is expected to pick up in the fall.

Truck Demonstration in New Orleans

NEW ORLEANS, LA., July 1.—Demonstrations as to the ability of 5-ton Pierce-Arrow trucks formed the feature of the commercial vehicle interest during June. An efficiency of 20 per cent. over animal traction was established in the grain carrying delivery to the docks. This test is of importance to all makers of trucks, as the annual tonnage in this delivery is very large and will mean the occupation of a large number of trucks if grain dealers can be convinced that a saving will result for the entire time represented by the life of the truck. The tests were made under what is known locally as "New Orleans" conditions; that is, where a portion of the haul is made through the sticky soil of unimproved streets and over the cobblestone paving characteristic of the harbor districts.

By making trips into the interior with loads of food and clothing for the relief of the flood sufferers, the Pierce-Arrow trucks accomplished a feat, the success of which was regarded dubiously by the agents themselves. This is the first worm-driven truck to be displayed here.

Business during June in the local commercial vehicle market has taken an encouraging turn. The failure of business to show a depression following the flood losses has spurred business houses to the consideration of greatest efficiency in handling the increasing trade which is marking nearly every branch of industrial activity. Actual sales have been light, but firms which never before would listen to any proposition to change their haulage system are now examining the question exhaustively. Actual sales during June totaled 14 trucks. In addition, a number of trucks are being used on trial where the ultimate sale practically is assured. The city sewerage and water board placed an order for 5 Maxwell service wagons, which will be used in carrying tools and equipment. One of the cars has been fitted to serve as a pay car. One Kelly truck was sold to a transfer company, 5 Ford commercial cars have been sold to a retail grocery firm, and 3 1-ton White trucks were sold to a department store.

Great Success Expected in Providence

PROVIDENCE, R. I., July 1.—As a result of a gradual awakening in the motor truck business here, commercial vehicle agents in that city are looking for the biggest and most successful year which they have yet had. Sales of all makes have shown a slow but sound growth since the beginning of the year, and the month of June is expected to be the best yet. While the city and state have been slow to awaken to the possibilities of the commercial vehicle, dealers are practically unanimous in stating that they regard the business as being as yet in its infancy, as far as Rhode Island is concerned.

The steady growth of the demand is shown nowhere more convincingly than in the sale of the lighter delivery trucks, 800 to 1000 pounds, which have gained greatly in popularity during the past month or two. But few of the heavier trucks, for ice, coal and brewery use, are being placed, many of the dealers arguing that the great demand for pleasure vehicles makes the pushing of truck sales a side issue.

Washington Sales Exceptionally Good

WASHINGTON, D. C., July 1.—Business in Washington, D. C., and the adjoining territory has kept up remarkably well during the latter part of May and early June. The situation in Washington is peculiar, owing to the fact that no manufacturing is allowed in the District of Columbia, and that business in all lines becomes very quiet during the summer, as nearly everybody connected with the government service is gone for at least a part of the season. So, as a rule, those who have not bought delivery cars or trucks in the spring, put off purchasing until fall, when business picks up again. Those, however, who have Maryland and Virginia in their territory, along with the District, are not affected to so great an extent by this fact. But notwithstanding these conditions, the sales have been exceptionally good during the past thirty days.

Charles W. Semmes, agent for the Wilcox trucks, has sold a truck during the last two weeks to Hecht & Co., one of the department stores, for their suburban deliveries, and two to the Pure Ice Cream Company of Richmond, Va.

Mr. Semmes now has his bus line in operation between Washington, D. C., and Brandywine, Md. This car, consisting of a Wilcox truck fitted with a bus body, carrying 22 passengers, covers 72 miles daily, and has so far made the two trips daily on schedule time, and Mr. Semmes feels confident that the project will prove successful, and expects soon to start a freight service.

Business has been exceptionally good this spring in delivery wagons. Washington, with its many miles of asphalt pavements, is a place where the use of the light delivery wagon is bound to become very general. This is shown by the experience of Charles Miller & Bro., Ford agents. The Ford delivery wagon was not put on sale here until last fall, and the first 20 received "went like hot cakes." Mr. Miller attributes this largely to the fact that a light car like the Ford will do so much better on a smooth asphalt pavement than on the rough stone and block pavements of some cities where put to heavy service. "People will insist on overloading," says Mr. Miller. "The capacity of the Ford delivery wagon is 750 pounds. Yet we have one customer, a grocer, who has two of our cars, and he does not hesitate to load on 1,500 pounds for a trip. The cars, of course, would not stand up long under this usage were it not for the ideal road conditions." Since the spring business opened up, business has been very good with this firm, though Mr. Miller says that he expects it will be slow from now on until fall. The Ford car seems to be especially popular with florists, dealers in fancy groceries, dairies, and laundries.

One large laundry that has 28 teams has had a Ford car for some months, and it expects, as soon as it can dispose of its teams and wagons, to put in 16 more. It will put in only 16 because it is estimated that these will easily do more work than the 28 teams. Tests made so far in their business show that one Ford delivery wagon will do the work of two wagons drawn by horses, and the Ford car will do it in three hours less time, and at practically the same expense as for one team. R. W. Claxton, fish dealer, finds that his business has increased 40 per cent. since putting in a Ford wagon, as he finds he can take orders up to 5.45 for delivery for dinner, something he could not do before.

Woodward & Lothrop, one of the largest department stores, now employing about 20 electrics for delivery purposes, is experimenting with a Ford gasoline car, and if it finds it is cheaper and more satisfactory, expects to put in more of them.

The Buick Company have only recently started pushing their delivery wagon, and a new salesman is in charge of this department. This wagon, having a larger capacity, is being used to a large extent by the wholesale meat dealers, as well as by grocers and others. R. F. Bradbury has equipped one of them with a bus body to cover a section of the city which has poor street car facilities, namely Pennsylvania avenue S. E. to Bradbury Heights. This bus makes 12 round trips a day of 7 miles each. Another car with the same equipment has been ordered in order to take care of the increasing traffic.

The Flanders agency also during May began selling delivery wagons, and 8 sales were made during the latter part of May and in June, and the company reports good prospects for summer business.

Business in Winnipeg Far Ahead

WINNIPEG, CANADA, July 1.—The commercial vehicle business in Winnipeg this summer is far ahead of that of any previous year. Every agency is doing a better business than was anticipated at the start of the season, and a noticeable feature is the increasing interest in the light delivery trucks.

In Western Canada there are this summer in operation nearly 5000 gasoline tractors, making a capital investment of over $19,000,000. During June and July most of these tractors are breaking up virgin prairie sod. Many thousands of acres will thus be added to the crop area of Western Canada this summer.

The tractor trials and contests at the Winnipeg Industrial which opens on July 10 and extends to July 20, will this year be on a larger scale than ever. This contest is now recognized to be the greatest of its kind in the world.

War Rules for Trucks

British Government War Department Issues Specifications for Motor Trucks for Subsidy Scheme for Truckmakers

Specifications are poorly drafted, and are not in keeping with progress and national trend of the truck interests in Great Britain. Many absurd restrictions are made use of. Some general criticisms on the specifications.

LONDON, June 15.—The draft of specifications for gasoline trucks which has been issued by the War Department lays down very arbitrary lines of construction and designs for the trucks, which the department expects to grant annual subsidies to after July of this year. Whoever have been responsible for drafting the truck specifications have demonstrated that they have been anything but familiar with the latest in truck design and construction. So uncommercial are the specifications that already many of the big truck manufacturers have refused to have anything to do with the subject, which is a regretable state of affairs, and it is expected that the War Department will have to modify its draft if a granting of a subsidy to every truck in operation in the country which is a duplicate of a model approved by the War Department, is to have the desired effect.

There are many commendable features in the specifications, which aim at uniform control system for all vehicles, the reduction of parts to be carried as spares, the protection of parts from dust and water, the requiring lubricant system for 200 miles, insisting on a four-speed gear-set, but with these the wisdom of the draft ends. The motor specifications are quite absurd; the minimum cylinder bore of 4.5 inches for a 3-ton truck and 4 inches for a 1.5-ton truck. The draft requires a four-cylinder motor with cylinders cast in pairs; the monobloc casting is ruled out entirely. The draft requires large inspection plates on the sides of the crank case for adjusting the lower ends of the connecting rods. This construction is becoming obsolete with the leading makers.

Another example of absurdity is the recommendation in conjunction with the rear axle which reads: "The final transmission of power to the road wheels is to be by means of a live axle in which a bevel drive of approved design should be employed. Chain drive to hind axle will not be permitted."

Still another example of where the War Office draft is at variance with commercial practice is that the draft explicitly lays down that "The power must not be transmitted through the rear springs. Preferably an enclosed propellor shaft should be used with a combined torque number ending in a universal joint." Several of the leading makers in this country are driving through the rear springs and entirely dispensing with the use of radius rods.

A general criticism of the entire draft of truck specifications shows that it is quite out of sympathy with present trends of design and it is a certainty that many changes will have to be made by the War Department if it is to meet with the approval which a national subsidy scheme should.

The New York Electric Show

THE electrical exposition and automobile show to be held in Grand Central Palace, New York, October 9 to 19, promises to be one of the biggest expositions of its kind and one of special importance to manufacturers of electric vehicles, battery manufacturers and others. Already many applications for space have been received and the exhibitors' list contains up to date the following makers of electrical vehicles: General Motors Truck Co., Babcock Electric Carriage Co., Anderson Electric Car Co., Lansden Co., Studebaker Corporation, Baker Motor Vehicle Co., S. R. Bailey Co. and Atlantic Vehicle Co.

Some of the other concerns entered are: Edison Storage Battery Co., Electric Storage Battery Co., Philadelphia Storage Battery Co., Thos. A. Edison, Inc., National Electric Lamp Assn., and Straight Filament Lamp Co.

During the exhibition the third floor of the Palace will be given over to a track for demonstrating electric vehicles. The show is being staged by the Electrical Show Co., with general offices at 124 West Forty-second street.

Best Year in History for Motor Trucks

WILMINGTON, DEL.—The past six months, according to local dealers in motor trucks and commercial vehicles generally, have been the best in the history of the trade here, and, judging by the number of inquiries, the outlook is sufficiently encouraging to indicate that the next six months will be even better than the last. Nearly every kind of business which requires local transportation either has accepted the commercial car, is trying it, or contemplates doing so. This shows that the motor truck has come to stay.

While the gasoline car is largely in the majority because it was on the ground first, the electric is coming into favor, the Wilson Line of steamboats having demonstrated, with its fleet of six electric commercials, that that car can do all that is claimed for it, and they have given such satisfactory evidence of their ability and durability that more cars of this kind are likely to be adopted by local freight handlers.

Some of the stores, which a few months ago regarded the commercial vehicle as a sort of toy, or an experiment at the best, and began using them with feelings of uncertainty, have given proof of their confidence in this sort of service by buying additional cars, usually larger and more powerful than the first, which were evidently used merely as a try-out.

In only one instance—where extensive traffic was involved—have the motor trucks been replaced by horses, after a trial, so far as can be learned. This was the case of a coal and building supply firm, which, because the kind of cars it used required experienced handlers, made it practically an impossibility to have them operated by the men who loaded and unloaded the coal and building material. The result was that two sets of men were required on each car.

THE city of Detroit has recently been experimenting with a 5-ton G.M.C. truck for carrying hot asphalt in street paving work. A standard rear dumping body is used. In watching its performance recently the truck was transporting the asphalt 3.2 miles from the plant. It carried its 5-ton load and made a trip every 55 minutes or eight trips per day, transporting 42 tons. The total daily distance was approximately 50 miles.

When comparing this performance with horse vehicles previously used in the work it was discovered that each team could make but three trips a day, delivering a total of 9 tons. The motor truck is practically doing the work of five teams.

SINCE June 17 the general offices of the General Motors Truck Company have been located at the Pontiac, Mich., factory instead of in Detroit. The truck factories are at Owosso and Pontiac. The factory organizations, both at Pontiac and Owosso, will remain intact, as heretofore, with an executive direction from Pontiac. The present branch offices will be retained at Detroit, and located at the new garage and service station, which is being erected at Twelfth street, Lafayette boulevard and Fort street.

New Truck Warranty

N.A.A.M. Adopts Standard Form of 90-Day Warranty for Truck Makers and Also Caution Plate

Statistics of Association show that at the beginning of the year America had over 18,000 motor trucks at a valuation of over $36,000,000. These figures, however, represent but a fraction of the whole motor truck industry.

THE Commercial Vehicle Committee of the N. A. A. M. met in this city on June 4 for the purpose of discussing the adoption of a standard form of warranty by the national association for all of its members who are manufacturing trucks. The committee also recommended the use of a caution plate on trucks to avoid overloading and overspeeding.

The session was attended by over a score of representatives of the leading truck makers and in addition to the warranty and overloading discussions Chairman S. D. Waldon of the Commercial Vehicle Committee of the N. A. A. M., reported good progress on the collection of statistics covering the production of motor trucks by different American makers up to December 31, 1911. The report showed that eighty-two companies have given in their figures showing a total of 18,700 commercial motor vehicles built and sold by these companies up to that date. The work of collecting this data is far from complete as fewer than half of the companies have to date furnished the information, among these being some of the largest manufacturers. Chairman Waldon believes that two-thirds of the actual numbers that have been manufactured have reported to date. The figures collected show that during 1911 there were 40 per cent. more commercial vehicles manufactured than during all of the years previous to that date. The vehicles reported represent the valuation of over $36,000,000.

The standard form of warranty which the N. A. A. M. has recommended differs but little in intent from that used in the pleasure car field and covers a period of 90 days. The N. A. A. M. has recommended that it be printed in catalogues and made a part of all contracts of sale by printing it on the back or face of the contract or by a specific reference in the contract to the warranty as published in the catalogue of the company.

Form of Standard Warranty

The warranty is to be known as The Standard Motor Truck Warranty of the National Association of Automobile Manufacturers, Inc., and is as follows:

We warrant the new motor trucks manufactured by us to be free from defects in material and workmanship, this warranty being limited to making good at our factory any part or parts thereof which shall, within 90 days after delivery of the truck to the original purchaser, be returned to us with transportation charges prepaid, and which our examination shall disclose to our satisfaction to have been thus defective.

This warranty shall not apply to any truck which shall have been repaired or altered outside of our factory in any way, so as, in our judgment, to affect its stability or reliability, nor to any truck which has been operated at a speed exceeding the factory rated speed, or loaded beyond the factory rated load capacity, or which has been the subject of other misuse, negligence or accident.

We make no warranty whatever in respect to tires, rims, ignition apparatus, lamps, gas tanks, signalling devices, generators, batteries or other trade accessories, inasmuch as they are usually warranted separately by their respective manufacturers.

The foregoing obligation to make good any defective parts returned as herein provided is in lieu of all other warranties expressed or implied, and of all other obligations or liabilities on our part, and we neither assume nor authorize any other person to assume for us any other liability in connection with the sale of our trucks.

The commercial vehicle committee is desirous of stopping overloading and overspeeding of trucks and to accomplish this has recommended a caution plate to be fitted in a conspicuous place on every truck sold. The exact design and style of the plate have not yet been determined, but it is intended that it will supplement the name plate on the dash and be attached to the back of the driver's seat or in some other place where it will be seen when loading. It has a three-fold purpose, namely, to warn against most common abuses of overloading and overspeeding, to have a moral effect upon the body builder, to keep the body weight down to standard allowances set by the N. A. A. M., and to have a record on the machine of the total weight of load so that a road scout, working in the interest of the truck maker, can check up flagrant abuses of overloading which he detects on the street and have the trucks weighed so that he can serve notice on the owner that he is nullifying the truck's warranty by such action. The information on the plate follows:

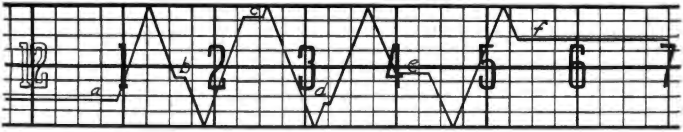
CAUTION
Overloading or Overspeeding
Will Void Your Warranty.
——— *Ton Truck.*

No. ——	*Speed Standard*	*Miles per Hour.* *Actual*
Weight of Chassis	——— *lbs.*	——— *lbs.*
Body Weight Allowance	——— *lbs.*	——— *lbs.*
Useful Load Capacity	——— *lbs.*	——— *lbs.*
Total weight, chassis, body and load, not to exceed	——— *lbs.*	——— *lbs.*

Name of Manufacturer.

The committee is also investigating the question of heights of frames and platforms from the ground, wheel diameter and tire sizes, and also the proportion of useful load to chassis weight. It is the general consensus of opinion that this committee should take up and have power to investigate and recommend on subjects of speed ratings, allowances of body weights, uniform widths and lengths of frames back of seat to provide for interchangeability of bodies, and also give attention to the general structure of the vehicle and its different units with a view to more economical production, improvement in design and construction.

The subject of insurance on motor trucks was introduced as one that seemed to call for the attention of the manufacturers, as the rates appeared to be too high and illogical. The same rates apply to commercial vehicles as to pleasure cars for fire, theft and collision insurance and are increased uniformly according to the age of the machine. Property damage and personal liability insurance, which are written by casualty companies, are based on horsepower and on occupation. A statement prepared by an insurance man showed that a motor truck listed in the catalogue at $1,500 takes a charge of $60 for fire and collision insurance under the rates made by the Automobile Underwriters' Conference, while the premium for property damage and liability is $115, making a total of $175. For every increase in catalogue price there is a charge of $20 in the total. The question was referred to Mr. Marvin.



This is a reproduction of a portion of a tape used by the Massachusetts Institute of Technology in securing data on relative cost of operating horse vehicles, electric vehicles and gasoline vehicles. The tape is unwound off one roll and on to another by clock mechanism, and while the tape is in movement a pencil connected with the road wheel of vehicle traces a line which shows the speed at which the vehicle travels, how long it is in motion each day and when, how long it is idle and when, the total number of stops made each day. The heavy zigzag line is the one traced by the pencil and its translation is as follows: When the line is horizontal it indicates the truck is idle, when inclined it indicates movement, and its slope is proportional to the vehicle speed. The faster the speed the greater the slope and vice versa. A indicates a rest at lunch; B shows a loading period; the line from A to B represents 2.7 miles, and the speed between these points was 4.25 miles per hour. The horizontal C is an unloading stop, D is a loading stop, E is unloading and F is the stable at night. Squares read horizontally give time and read vertically speed in miles

Analyzing the Cost of Motor Trucking

An Examination of Actual Data by an Expert Department—Investigating Special Conditions—How to Decrease the Cost of Upkeep and Get Maximum Efficiency—The Means by Which Data Are Obtained

THE comparison of cost of upkeep in dollars and cents is not a true criterion of the value of the motor vehicle as against that of the horse-drawn vehicle. It is in value of service that the motor vehicle gathers its laurels, and service conditions *must* be analyzed before a vehicle is bought. It is not sufficient to analyze prevailing conditions alone; those that ought to be forthcoming must be examined as well. An ideal service must be constructed from reliable data.

Actual users are the only suppliers of such data, and by well-organized efforts the electrical engineering department of the Massachusetts Institute of Technology is acquiring from many actual users a mass of valuable information on the subject of transportation costs. When facts are ascertained they are tabulated in such a form that those intending to supersede the horse vehicle by a motor truck, and those already using motor vehicles, may obtain therefrom the maximum value of the information.

This work was originated by the request of many users of motor vehicles for absolute reliable information on costs and conditions and their inter-acting influences. Nobody could be better equipped for such a service than the Massachusetts Institute of Technology, and the systematic methods by which the data is being acquired are enumerated in this article. Meanwhile, it is sufficient to say that these facts, so far as they go, may be considered as thoroughly reliable, being an exact representation of existing conditions amongst users of the motor vehicle in New York, Boston, Chicago, Brooklyn, Buffalo, Cincinnati, Cleveland, Dayton, Detroit, Indianapolis, Philadelphia, St. Louis and many other cities.

The importance of this investigation must be fully realized if true benefit is to be derived therefrom. The investigation, which was undertaken in May, 1911, is the first organized effort to inquire into the most favorable conditions for buying a commercial vehicle, to ascertain the minimum cost with the maximum efficiency of a vehicle and to form a comparison among the electric truck, the gasoline truck and the horse vehicle. The investigation is still under way and the report now issued is only a preliminary one. As will be seen, however, there is sufficient therein to beget much thought and to formulate the primary laws of efficient motor vehicle transportation, although for purposes of comparison of cost the results up to the present are not of much value.

The data already acquired may be divided into four classes, namely, a, information supplied by truck users and tabulated on forms by the members of the department; b, information gathered from the personal observations of the students; c, the results of a visit made by H. F. Thomson, of the electrical engineering department, Massachusetts Institute of Technology, to a number of the largest cities of the East, and d, data obtained by using the tape record on motor and horse vehicles in the city of Boston.

The Limits of the Information Obtained

The forms that were made out and despatched to owners of vehicles covered the field of truck operations fairly well, and the information obtained from them has been tabulated and arranged in the easily readable form shown in the accompanying reproductions. All data found here can be actually used and applied by owners and intending owners of commercial vehicles, and therein lies its intrinsic value. The information, as far as it goes, is an actual record of results.

It would be as well to give some idea of the limits of the information already supplied by the Institute. Details concerning the following electric trucks have been furnished by owners: One 500-pound, two 700-pound, eight 1000-pound, one 1,500-pound, twelve 2,000-pound, five 3,000-pound, two 4,000-pound, one 5,000-pound, two 6,000-pound and one 7,000-pound trucks. A correct average of expenses and performing powers of a truck cannot be formed from an estimate of one example only, nor even two or three. Only in three cases, the 1,000-pound, 2,000-pound and 3,000-pound trucks, can a true idea be gained of the annual cost of upkeep of trucks of similar capacity respectively. As an example of the impossibility of obtaining a truly representative idea of the cost of some trucks, it should be noticed that in the accompanying Table V the details furnished with regard to No. 8, a 6,000-pound truck, consist of costs of lubricants, electricity and battery only, amounting to an annual sum of $528.68. The other example of a 6,000-pound truck given appears with costs of battery, tires and overhaul, the rest being omitted, the total cost per annum amounting to $561.53. It would be nonsensical to quote these figures as representing the total yearly cost of an electric truck of 6,000 pounds capacity, so from these tables it is impossible to acquire any definite idea of the annual cost of such a vehicle. The same remarks apply to the 500-pound truck. It is only by comparing a large number of instances that a correct estimate can be found.

Finding the Annual Value of Special Items

With regard to gasoline motor trucks, only one example of a 500-pound, three of a 2,000-pound, one of a 3,000-pound, two of a 6,000-pound, one of an 8,000-pound and two of a 10,000-pound truck are given. Thus it is impossible to contrast the relative values of electric and gasoline trucks.

There is no information as to the capacity of the horse vehicles that have been examined; consequently, it is similarly useless to compare the annual cost of these horse vehicles with the annual cost of the motor trucks.

It is in finding out the annual value of special items, such as cost of lubricants, gasoline, running repairs, etc., that these forms will be found useful. As will be seen in the chart depicting the annual cost of running repairs, lubricants, electricity and tires, of electric vehicles of different capacity, the gradation of the curves corresponds fairly well with the degree of capacity. The 1,000-pound, 2,000-pound and 3,000-pound trucks, however, should be the only ones taken as strictly approximate examples. The others are founded on such a few estimates, that their value is practically nil.

The items of driver, garage, amortization and administration are practically fixed charges, not fluctuating with the capacity of the vehicle, so that the average amounts opposite these items in Table I may be taken as approximate values, having been computed from the total number of examples of electric truck furnished by the Institute.

The items of interest, insurance and taxes are given in only a very few cases, so that no correct notion can be gathered of the annual cost of these from the data at present supplied.

Mileage depends so greatly upon the special conditions of service that it would be useless to compare the mileage of trucks of different capacity.

There is no information which can provide an idea of the average weight of the load carried by each truck, and it appears that in many cases the cost of electricity has been confused with the cost of battery upkeep.

Table I. Average Annual Fixed Expenses

These expenses do not include the cost of such items as current, repairs, tires, gasoline, lubricants, etc., as these costs vary with the machine and with the work for which the machine is used or the district in which it operates.

		Number of Examples Taken
Operating Expenses		
Driver	$ 746.56	19
Garage	288.80	19
	$1,035.36	
Maintenance Expenses		
Overhaul and painting	$156.54	24
Fixed Expenses:		
Amortization	457.04	25
Administration	70.34	21
Interest	149.01	6
Insurance	67.08	7
Taxes	71.99	4
	$815.46	
TOTAL	$2,007.36	

Some concerns have grouped many of the expenses in one big total; it is far better to treat each separate item in a single account, and thus have a guide that will faithfully indicate in which directions and to what extent expenses must be cut.

It should also be understood that these reports do not contain estimates dealing with figures of work accomplished this present year. The two filled-in forms actually reproduced in the report are both dated June, 1911.

In examining the truck problem the great point to be remembered is this: There are special conditions affecting every truck. These conditions must be analyzed, point by point, and comparisons made and costs defined. Once the truck has been obtained there must be no cessation of the acquirement of data. It is only by testing that a man's or a beast's or a machine's efficiency can be estimated, and the testing adds to that efficiency, because it develops certain faculties or powers that might otherwise lie dormant. Data are as valuable as results. The power to draw conclusions from data is as valuable as the power to decrease costs; in

Chart Showing the Average Expenses of an Electric Truck

This chart gives a very good idea of the average annual comparative cost of lubricants, electricity, running repairs and tires.

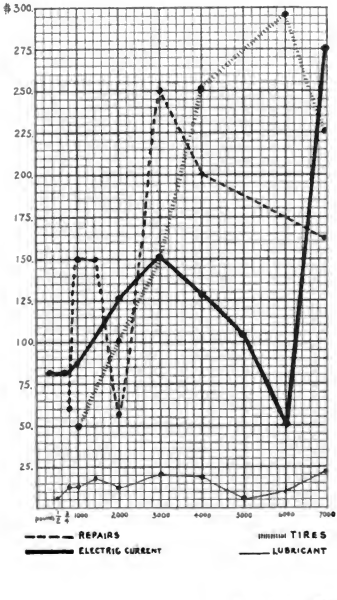


Table II. Summary of Reports for Electric Trucks

The 1,000-lb. truck examples are good and the annual expenses have been well filled in by the owners. The complete lack of information regarding days out of commission, trips, stops and weight of loads is remarkable and worthy the attention of owners.

General:										
Rating	500 lb.	700 lb.	700 lb.	700 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.
Company	No. 8	Nu. 9	No. 9	No. 9	No. 49	No. 79	No. 9	No. 9	No. 9	No. 9
Business	El. Lt.	El. Lt.	El. Lt.	El. Lt.	El. Lt.	El. Lt.	El. Lt.	El. Lt.	El. Lt.	El. Lt.
Service	Meter	Instal.	Instal.	Instal.	Lamps	Lamps	Maint.	Instal.	Instal.	Instal.
Period of data	16 mo.	3 mo.	2.7 mo.	2.3 mo.	16 mo.	12 mo.	24 mo.	32 mo.	25 mo.	19 mo.
No. of trucks averaged	1	15	1	1	1	1	1	1	1	1
Truck—Cost	$1,500	$1,973	$1,973	$1,973	....	....	$2,840	$2,421	$2,418	$2,450
Age	20 mo.	0.6-3 mo.	3 mo.	3 m.	16 mo.	34 mo.	60 mo.	32 mo.	25 mo.	19 mo.
Co.'s number	2	96-110	101	107	....	2	9	38	60	65
Battery	Lead	Alkaline	Alkaline	Alkaline	Lead	Lead	Lead	Lead	Lead	Lead
Performance—Annual:										
Miles	4,834	6,264	5,120	7,085	5,797	3,989	3,593	6,053	5,640	6,480
Kilowatt-hours	2,712	4,109	3,618	4,408	....	1,704	2,935	2,432	2,354	2,983
Days used	....	302	293	300	....	293	190	260	269	282
Days out of commission	....	....	....	....	....	23	....	....	....	....
Trips	....	....	....	....	....	....	....	....	....	....
Stops	....	....	....	....	....	....	....	....	....	....
Weight of Loads	....	....	....	....	....	....	....	....	....	....
Expense—Annual:										
Operation—										
Running repairs	✓	$87.14	$42.36	$44.04	$44.11	$37.06	$401.16	$156.48	$76.92	$195.00
Lubricants	$6.03	12.45	10.32	12.12	1.71	3.50	13.68	15.12	16.56	16.68
Electricity	81.97	....	....	....	....	85.20	....	....	....	....
Garage	....	263.45	283.20	288.96	✓	307.50	264.36	277.80	290.88	325.08
Sundries	....	56.45	30.84	26.04	✓	....	10.44	13.80	16.44	14.88
Driver	....	729.60	808.32	....	....	728.00	61.56	570.84	696.12	732.96
Maintenance—										
Battery	615.50	61.02	42.00	58.56	124.20	187.71	363.36	252.72	207.96	189.84
Tire		0.00	0.00	0.00	0.00	0.00	104 04	125.76	17.64	24.12
Overhaul					231.73	113.60				
Painting					58.02		118.56	146.04	118.92	69.96
Fixed Charges—										
Amortization	....	324.00	324.00	324.00	....	264.00	473.28	396.00	408.00	408.00
Administration	....	84.80	90.00	90.24	....	....	47.40	57.72	60.84	68.88
Interest	....	....	....	....	....	110.00	....	....	....	....
Insurance	....	....	....	....	....	182.56	....	....	....	....
Taxes	....	....	....	....	....	....	....	....	....	....
Co.'s total expense	$703.50	$1,618.91	$1,631.04	$843.96	$459.77	$2,019.13	$1,857.84	$2,012.28	$1,910.28	$2,045.40

Table III. Summary of Reports for Electric Trucks

The V sign in these reports indicates that the items so marked are included under other heads. In the last column four operating expenses are grouped together and in most cases overhaul and painting are grouped as one. Service controls these operations.

General:										
Rating	2,000 lb.	2,000 lb.	2,000 lb.	2,000 lb.	2,000 lb.	2,000 and 3,000 lb.	3,000 lb.	3,000 lb.	3,000 lb.	3,000 lb.
Company	No. 9	No. 9	No. 9	No 9	No. 50	No. 15	No. 15	No. 15	No. 9	No. 49b
Business	El. Lt.	El. Lt.	El. Lt.	El. Lt.	El. Lt.	El. Lt.	El. Lt.	El. Lt.	El. Lt.	....
Service	Maint.	Spare	Instal.	Instal.	Miscel.	....	Meters	Lamps	Maint.	Miscel.
Period of data	17 mo	8 mo.	7 mo.	7 mo.	13 mo.	30 mo.	20 mo.	26 mo.	5 mo.	17 mo.
No. of trucks averaged	1	1	1	1	1	18	1	1	1	1
Truck—Cost	$3,797	$3,470	$3,470	$3,230	....	$2,500	....	....	$3,200	....
Age	17 mo.	8 mo.	7 mo.	7 mo.	....	2.30 mo.	20 mo.	26 mo.	5 mo.	17 mo.
Co.'s number	69	86	87	88	....	....	18	15	94	....
Battery	Alkaline	Alkaline	Alkaline	Alkaline	Lead	Lead	Lead	Lead	Alkaline	Lead
Performance—Annual:										
Miles	6,924	3,630	3,943	4,932	9,366	9,420	9,727	9,988	6,052	7,080
Kilowatt-hours	5,520	3,684	3,336	3,757	6,128	4,704	3,786	3,704	5,388	....
Days used	292	216	298	271	....	296	297	281	300	....
Days out of commission	....	....	....	....	....	....	15	37	....	....
Trips	....	....	....	....	....	....	....	....	....	....
Stops	....	....	....	....	....	....	....	....	....	....
Weight of loads	....	....	....	....	....	....	....	....	....	....
Expense—Annual:										
Operation—										
Running repairs	$85.44	$71.40	$126.84	$64.08	✓	$229.68	$229.68	$229.68	$295.80	$583.68
Lubricants	17.28	17.28	15.60	14.76	✓				19.44	
Electricity	....	....	....	....	$122.56	176.16	151.44	148.16	....	
Garage	320.52	287.28	297.48	276.00	....	111.96	111.95	111.96	316.80	
Sundries	24.72	19.08	125.88	18.96	....	69.84	55.56	47.77	21.84	
Driver	0.00	55.92	0.00	745.56	....	780.00	747.36	768.80	739.68	668.52
Maintenance—										
Battery	73.44	45.36	51.48	49.20	189.18	153.36	157.36	55.58	61.32	199.56
Tire	205.20	0.00	0.00	0.00	283.39	81.48	98.16	137.65	0.00	267.48
Overhaul	125.40	0.00	0.00	60.00	411.41	159.84	76.84	46.67	0.00	
Painting							44.63	23.81		....
Fixed Charges—										
Amortization	408.00	588.00	588.00	600.00	....	192.48	230.00	230.00	540.00	....
Administration	69.84	79.32	81.00	82.08	....	62.52	62.52	62.52	85.92	....
Interest	....	....	....	....	....	125.04	150.00	150.00	....	....
Insurance	....	....	....	....	....	12.50	15.00	15.00	....	....
Taxes	....	....	....	....	....	69.48	77.50	77.50	....	....
Co.'s total expense	$1,329.84	$1,163.64	$1,286.28	$1,910.64	$1,006.54	$2,224.34	$2,208.01	$2,105.10	$2,080.80	$1,719.24

fact, the latter is the offspring of the former. But in the first place data must be full and reliable.

Briefly, the following facts should be ascertained with regard to a truck before purchasing. As to the truck itself, its capacity, its cost, its operation, its availability for service and the average life of its motor and tires under correct usage should be known. Apart from the vehicle, the nature of the goods to be carried, the miles per day it will be necessary to make, the weight of the load which the vehicle will probably carry and the number of trips and stops to take place during a day will all have to be considered. Freight conditions in the town or city in which the vehicle is to operate must be known, tires must be selected to meet with the condition of the roads and streets, and motors selected capable of high or lower speeds according to the conditions of traffic in the neighborhood in question. In the case of an electric, the cost of the presumable consumption of electricity and in the case of a gasoline engine, the cost of

Table IV. Summary of Reports for Electric Trucks

A very good average can be gained from this table of the annual performance and annual operating expense of a 2,000-lb. electric truck, as several examples have been taken. The almost complete absence of insurance, interest and taxes amounts is noticeable.

General.										
Rating	1,000 lb.	1,000 lb.	1,500 lb.	2,000 lb.	2,000 lb.	2,000 lb.	2,000 lb.	2,000 lb.	2,000 lb.	2,000 lb.
Company	No. 9	No. 9	No. 9	No. 15	No. 21	No. 34	No 49a	No. 49d	No. 50	No. 9
Business	El. Lt.	El. Lt.	El. Lt.	El. Lt.	N'sp'per	Coffee	Gov.	Ice Cream	El. Lt.	El Lt.
Service	Instal.	Instal.	Maint.	Lamps	Delivery	Delivery	Miscel.	Delivery	Miscel.	Maint.
Period of data	19 mo.	7 mo.	4.6 mo	16 mo.	6 mo.	12 mo	36 mo.	14 mo.	14 mo.	16 mo.
No. of trucks averaged	1	1	1	1	1	3	1	15	1	1
Truck—Cost	$2,441	$2,720	$3,000	......	......	$2,500	......	......	......	$2,812
Age	19 mo.	7 mo.	5 mo.	16 mo.	6 mo.	12 mo.	36 mo.	......	......	78 mo.
Co.'s number	67	89	95	37	14	7, 9, 11	......	......	37	4
Battery	Lead	Alkaline	Alkaline	Lead	Alkaline	Lead	Lead	Lead	Lead	Lead
Performance—Annual:										
Miles	7,680	6,720	9,078	7,525	13,860	7,014	......	......	3,647	3,415
Kilowatt-hours	3,164	3,963	5,890	4,754	8,780	......	......	......	3,022	2,084
Days used	288	252	300	280	340	......	......	......	......	290
Days out of commission	......	......	......	28	......	......	......	......	......	......
Trips	......	......	......	......	......	......	......	......	......	......
Stops	......	......	......	......	......	......	......	......	......	......
Weight of loads	......	......	......	......	......	1,501,900 pounds	......	......	......	......
Expense—Annual:										
Operation—										
Running repairs	$181.80	$38.28	$141.48	$229.68	$8.40	$15.15	$20.15	✓	✓	$373.34
Lubricants	16.56	15.72	19.32		8.90	2.70	......	✓	✓	14.52
Electricity	......	......	......	190.16	87.72	186.54	......	......	$60.44	......
Garage	301.56	281.16	296.80	111.96	......	85.81	......	✓	......	257.16
Sundries	11.76	12.12	14.88	76.44	......	......	......	$38.52	......	8.40
Driver	637.20	703.68	825.24	0.00	......	696.00	......	......	......	0.00
Maintenance—										
Battery	195.72	45.72	67.92	75.18	......	27.10	88.76	110.48	83.97	398.76
Tire	102.60	0.00	6.48	65.72	......	25.80	78.33	119.72	180.00	132.24
Overhaul				223.82	......	11.50	217.00	295.42		
Painting	86.04	0.00	0.00	0.00	......	0.00	......	......	302.00	152.04
Fixed Charges—										
Amortization	408.00	456.00	504.00	192.48	......	500.00	......	......	......	468.72
Administration	64.92	82.08	85.92	62.52	......	......	......	......	......	45.72
Interest	......	......	......	125.04	......	......	......	......	......	......
Insurance	......	......	......	12.50	......	80.00	......	......	......	......
Taxes	......	......	......	69.48	......	......	......	......	......	......
Co.'s total expense	$2,006.16	$1,634.76	$1,962.04	$1,434.98	$105.02	$1,630.60	$404 24	$564.14	$626 41	$1,851.00

Table V. Summary of Reports for Electric Trucks

The figures in these examples of heavier trucks are not good and the totals should not be taken as average estimates of costs.

4,000 lb.	4,000 lb.	5,000 lb.	6,000 lb.	6,000 lb	7,000 lb.
No. 50	No. 9	No. 4	No. 8	No. 49c	No. 9
El. Lt.	El. Lt.	Glue	El. Lt.	Brewery	El. Lt.
......	Maint.	Hauling	Construc.	Melivery	Operating
14 mo.	6 mo.	5 mo.	16 mo.	24 mo.	26 mo.
1	1	1	1	1	1
......	$4,630	$3,900	......	......	$4,900
......	6 mo.	5 mo.	16 mo.	24 mo.	26 mo.
44	93	......	1	......	49
Lead	Alkaline	Lead	Lead	Lead	Lead
7,171	7,328	6,292	1,550	......	3,643
6,490	9,552	......	1,758	......	4,034
......	284	238	......	......	300
......	......	......	......	......	......
......	......	399	......	......	......
......	......	......	......	......	......
......	......	1,659,000 pound	......	......	......
✓	$196.62	......	......	......	$151.68
✓	16.64	$4.40	$5.88	......	17.28
$ 129.80	......	112.83	52.70	......	......
......	271.24	120.00	......	......	280.08
......	14.94	31.70	......	......	16.44
......	963.24	704.00	......	......	945.84
411.97	93.52	......	......	$380.58	126.24
365.24	128.00	0.00	470.10	123.60	215.52
......	......	93.47	......	57.35	......
365.75	80.00	......	......	......	65.28
......	780.00	975.00	......	......	816.00
......	73.58	......	......	......	59.76
......	......	234.00	......	......	......
......	......	152.00	......	......	......
......	......	......	......	......	......
$1,272.76	$2,617 78	$2,427.40	$528 68	$561.53	$2,694.12

the estimated consumption of gasoline must be figured. The increased cost of driving—in comparison with the horse vehicle—must also be borne in mind. Whether or not a vehicle will often be out of commission will affect the annual expense, as well as the chances that a vehicle may sometimes be inadequately loaded to its maximum extent on a paying basis.

After the machine has been purchased one must learn to operate it with least possible expense, at the same time getting from it all the work available under operating conditions. The operating expenses include running repairs, cost of lubrication, electricity or gasoline and sundries, rent of garage and salary of driver. Consider for a moment the operating expenses of a certain electric truck in comparison with those of a horse-drawn vehicle, figures being obtainable from the data given in the accompanying forms.

The operating expenses of a horse vehicle include shoeing, veterinary, feed, stable, repairs, sundries and driver. Taking one example, the cost of these amount annually to $1,079.80, representing an initial investment of $580 for wagon, horse aand harness. This was taken from an estimate of the operating costs of 75 horse vehicles.

The operating expenses of an electric, including cost of tires, overhaul and repainting, and representing an initial investment of, say, $3,000, for the vehicle, annually amount to $1,673.06. It will be at once seen that the comparison is odious from the viewpoint of the owner of the motor vehicle. Yet in other ways, if he is using that vehicle correctly, he is eliminating that extra cost of upkeep and adding a wide margin of profit. The work accomplished is frequently double or treble; the mileage traveled is much greater and a far greater quantity of goods can be transported in the motor vehicle and business possibilities vastly widened.

Fixed charges in connection with a motor vehicle include amortization, a fixed sum laid by annually as a fund for the replacement of a machine when it has ceased to be useful; administration, including all office expenses incidental to the successful management of a transportation department, interest, insurance and taxes. These fixed charges in the case of the electric vehicle mentioned above amount to $462.02. The fixed charges of a two-horse vehicle—not the one already mentioned, a one-horse vehicle, as figures for that are not available—amounts to $419.00. There is not much difference in these totals, although they vary according to conditions.

Decreasing the Cost of Upkeep

Next examine the total annual costs and expenses of horse vehicles and of electric trucks. One company's total annuel expense for an electric truck rated at 2,000 pounds is $1,434.98. Another firm's expense account for a horse wagon, drawn by one horse, amounts to $1,203.00; there

Table VI. Summary of Reports for Gasoline Trucks

Not so many examples of gasoline trucks have been taken as electric trucks. The figures obtained, however, are good in all cases, nearly all items having been filled in save those for the 500-lb. capacity truck and the third of the 2,000-lb. capacity trucks.

General										
Rating	500 lb.	2,000 lb.	2,000 lb.	2,000 lb.	3,000 lb.	6,000 lb.	6,000 lb.	8,000 lb.	10,000 lb.	10,000 lb.
Company	No. 8	No. 9	No. 9	No. 21	No. 85	No. 4	No. 4	No. 4	No. 82	No. 82
Business	El. Lt.	El. Lt.	El. Lt.	N'sp'per	Miscel.	Packing	Soap	Packing	Trucking	Trucking
Service	Service	Spare	Instal.	Delivery	Hauling	Hauling	Hauling	Hauling	Hauling	Hauling
Period of data	15 mo.	25 mo.	32 mo.	6 mo.	13 mo.	8 mo.	12 mo.	9 mo.	5 mo.	5 mo.
No. of trucks averaged	4	1	1	1	1	1	1	1	1	2
Truck—Cost	$950	$2,312	$1,934	....	$2,400	$3,700	$3,624	$5,283	$5,760	$5,760
Age	9-15 mo.	25 mo.	32 mo.	6 mo.	13 mo.	8 mo.	12 mo.	9 mo.	5 mo.	5 mo.
Co.'s number	5 to 11	59	39	....	1	....	....	....	1	2
Performance—Annual:										
Miles	9,679	4,263	10,067	8,052	5,850	7,442	7,172	6,336	7,232	8,483
Gallons of gasoline	1,370	653	1,075	1,152	931	....	1,965	2,125	....	....
Days used	....	125	250	....	298	258	295	242	279	318
Days out of commission	....	....	....	....	....	....	....	....	37	18
Trips	....	....	....	....	2,480	665	966	1,229	1,446	1,697
Stops	....	....	....	....	....	....	....	....	....	....
Weight of loads	....	....	....	....	1,316,000 Pound	3,152,000 Pound	3,535,000 Pound	8,165,000 Pound	6,176 Ton	7,554 Ton
Expense—Annual:										
Operation—										
Running repairs	✓	$404.64	$518.76	$4.08	$36.85	....	....	....	$744.96	$81.84
Lubricants	$65.74	18.00	14.40	6.96	16.27	$60.10	$32.02	$58.59	324 00	372.00
Gasoline	157.53	69.60	112.08	109.68	107.10	226.00	255.06	222.51	737.04	926 64
Garage	....	271.20	228.00	....	0.00	208.00	50.00	0.00	120.00	120.00
Sundries	....	15.12	19 32	....	....	14.45	7.53	192.52	....	....
Driver	....	247.08	705.36	....	1,009.12	1,036.00	1,100.00	959.52	1,196.00	1,296.00
Maintenance—										
Tire	267.96	19.92	151.56	....	150.00	584.00	111.05	0.00	1,740 00	2,064.00
Overhaul	} 591.78	} 45.24	} 190.32	....	} 62.13	} 442.00	17.60	56.30	....	....
Painting				....		....	....	....	....	....
Fixed Charges—										
Amortization	....	768.00	648.00	....	600.00	925.00	906.00	1,320.00	1,152.00	1,152.00
Administration	....	60.84	50.16	....	....	....	....	....	....	....
Interest	....	....	....	....	120.00	222 00	217.00	317.00	345 60	345.60
Insurance	....	....	....	....	125.00	191.00	93.00	126.00	....	....
Taxes	....	....	....	....	....	....	....	....	....	....
Co.'s total expense	$1,083.03	$1,919.64	$2,637.96	$120.72	$2,226.47	$3,908.55	$2,789.26	$3,252.44	$6,459.60	$6,358.08

is no information as to the capacity of the vehicle. There is not a great difference, $231.98, between the two figures, and this difference is entirely eliminated by the better service of the motor vehicle, its greater capacity for efficient work and its power to extend business—perhaps the most important point. The driver's salary, for some reason or other, is not included in the first estimate, but it should be noted that in the case of the horse wagon no mention is made of the fixed annual charges relative to interest, insurance and taxes, which at a rational estimate would approximate $122.

To decrease the additional cost of upkeep on the side of the motor vehicle, it is necessary to obtain from it standard service. That is to say, its center of paying utility must be found. The work which a motor truck can do in 1 day depends upon its average daily mileage and the time taken in loading and unloading. The daily mileage varies according to the conditions of service. The truck may be wanted for house-to-house deliveries in busy districts where a high speed is impossible owing to traffic conditions; or it may be wanted for long-distance journeys, 20 or 30 miles out of town. The kind of truck must be chosen with these conditions strictly in view. In either case speed in delivery is to a large extent dependent on the conditions of loading and unloading, and it is here that so many trucks fail to show profits for their owners. To test, is the only way to find whether a wagon is making a profit in this direction.

The Effect of Delays on Cost

An example of how delays in loading and unloading affect the cost of running a motor truck is given in the report of the investigations of the Institute. A horse-drawn and electric truck are considered, the former being a two-horse wagon, and the latter a 4,000-pound truck, each carrying a maximum load of 2 tons. The electric is rated, on smooth roads, at 9 miles per hour, and is good for about 35 miles per day. The horse wagon cannot do more than 15 miles per day. The average running speed of the horse vehicle is 3.5 miles per hour and the average running speed of the electric is 6.5 miles per hour. In order to attain the full running speed per hour of each vehicle the horse vehicle must be operated 4 hours and the electric 5.5 hours. Assuming that the working day consists of 9 hours, it can be seen that the electric must work for 12.37 hours if it is desired that the electric vehicle should attain a working level with the horse vehicle—that is, at rated speed. In order to bring that 12.37 hours down to the number of working hours, 9, the stops for loading and unloading must be considerably shortened. The standing time should not be more than 40 per cent. of the total time. Otherwise, the electric will only give about 26 miles per day instead of its rated mileage of 35. For as the number of hours necessary for the electric to reach its rated speed per hour is to the total number of miles for which it is good during the day, so is the number of working hours of the electric during the day to the number of miles given by the electric if the standing time is unreduced.

The ratio between the average number of miles a truck is making per day and its maximum mileage per day is known as the distance factor of a truck. Quoting from the pamphlet issued by the Institute, "the greater the distance factor in any case the less will be the cost per unit of the system; therefore, every effort should be made to maintain a high-distance factor." By means of the tape measure depicted, the electrical engineering department has gathered together a great deal of valuable information with regard to the time taken in loading and unloading. Taking one example, it is found that on one journey of 41 miles the wagon made four stops, two for loading and two for unloading. The time taken up by the first operations was from 15 to 20 minutes. (The *exact* figure was, of course, registered on the tape measure, but the tape record reproduced here is only divided into quarters of an hour). Time taken in unloading amounted to about 35 minutes. The period when the wagon was idle thus amounted to about 53 minutes, during a journey of about 4½ hours. In addition, the tape record gave the speed traveled, number of stops and the total time during which the wagon was in active use. By comparing the figures recorded on the tape, after several journeys have been tested, an average can easily be calculated which will serve as a sure basis for producing the maximum amount of efficiency. The distance factor raised to its utmost limit will bring cost down to its lowest figure, with special conditions of service duly considered.

Table VII. Summary of Reports for Horse Vehicles

A good idea of some of the operating expenses can be obtained, and the separate items can be compared profitably with those of gasoline and electric trucks. No mention is made, however, of the capacity of the various vehicles, and details are sufficiently meagre.

General:												
Rating	1 Horse	1 Horse	1 Horse	1 Horse	1 Horse	1 Horse	2 Horse	2 Horse	2 Horse	2 Horse	2 Horse	2 Horse
Company	No. 42	No. 15	No. 9	No. 7	No. 7	No. 86a	No. 42	No. 41	No. 53	No. 34	No. 4	No. 82
Business	H'dw'e	El. Lt.	El. Lt.	Stable	Stable	Trucking	H'dw'e	R'g'ters	Dpt. Store	Coffee	Packing	Bread
Service	Delivery	Service	Service	.....	.....	Miscel.	Delivery	Hauling	Relay	Delivery	Hauling	Delivery
Period of data	.....	12 mo.	16 mo.	.....	.....	12 mo.	.....	.....	.....	12 mo.	6 mo.	12 mo.
No. of units averaged	Rented	109	75	100	100	2	Rented	1	2	3	1	25
Ratio of horses to wagons	1	1	1	2	1	1½	2	2	4	2	2	2½
Investment	.....	$485	$580	$900	$600	$700	.....	.....	$1,475	.....	$1,000	$600
Performance—Annual:												
Miles	.....	.....	.....	.....	.....	.....	.....	4,000	4,700	.....	5,526	.....
Days each horse worked	.....	.....	.....	.....	.....	270	.....	.....	.....	.....	286	.....
Days each horse unable to work	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Trips	.....	.....	.....	.....	.....	.....	.....	900	.....	.....	603	.....
Stops	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Weight of loads	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,199,000 Pound	.....
Expense—Annual:												
Operation—												
Shoeing	✓	$205.20	$41.00	$60.00	$30.00	$45.00	✓	✓	$576.00	$683.27	.....	$64.00
Veterinary	✓		10.20	✓	✓	7.50	✓	.....			.....	✓
Feed	✓		290.80	394.00	197.00	219.00	✓	$268.10			$480.00	390.00
Stable	✓	156.00		339.00	169.50	85.50	✓	276.50			120.00	199.00
Repairs	✓	96.00	75.30	100.00	100.00	.....	✓	65.10	175.00		.....	.....
Sundries		.....	12.50	.....	.....	7.50		.....	.....		34.00	.....
Driver	✓	660.00	650.00	.....	.....	528.00	✓	700.00	1,456.00	729.47	888.00	400.00
Fixed Charges—												
Amortization	✓	48.50	76.20	90.00	60.00	182.50	✓	.....	246.00	37.88	156.00	125.00
Administration	✓	25.80	47.00	.....	.....	170.00	✓	54.40	.....	.....	.....	.....
Interest	✓	.....	.....	54.00	36.00	36.50	✓	.....	.....	.....	60.00	.....
Insurance	✓	.....	.....	60.00	35.00	22.50	✓	.....	.....	8.32	39.00	.....
Taxes	.....	5.04	.....	.....	.....	7.50	.....	.....	.....	.....	.....	.....
Co.'s total expense	$1,080.00	$1,196.54	$1,203.00	$1,097.00	$627.50	$1,311.50	$1,440.00	$1,364.10	$2,453.00	$1,458.94	$1,777.00	$1,178.00

These tapes have been affixed by the Institute to wagons owned by nine concerns representative of the city pick-up, furniture moving, freight handling, baggage transfer, wholesale and retail coal delivery, parcel delivery, bottled goods delivery, installation and maintenance service of a lighting company and miscellaneous hauling. From the results obtained from these records it is possible to form standards of actual working conditions and to find out the why and the wherefore of non-paying conditions in personal truck service.

From the data furnished by the Institute it is imperative that the following points be carefully considered when buying a truck, in addition to those already mentioned. The capacity of the vehicle should be considered as being wholly dependent on the work required from it and the cost of its maintenance. Take two examples of electric trucks in operation, one 1,000-pound truck and one 5,000-pound truck. The annual cost of maintaining the first amounts to $2,012.28. The annual cost of maintaining the second amounts to $2,427.40. There is a difference of 4,000 pounds in capacity, comparing with an increase of $415.12 in annual cost of upkeep. The annual cost of maintaining five 1,000-pound trucks would be five times the amount required for the upkeep of *one* 1,000-pound truck, that is, about $10,050—more than four times the annual expense of keeping one 5,000-pound truck. But conditions of delivery may necessitate the employment of five trucks traveling in different directions on regular routes. The average weight of each delivery should be ascertained. The number of routes it will be necessary to take each day will have to be found. If a big delivery is made regularly in one direction at a long distance, then a truck of high capacity will be needed. If numerous small deliveries are made regularly in many directions then a number of trucks of smaller capacity will be the best investment. But the main point to be remembered is this: If conditions of delivery and traffic permit it is always better to use one truck of high capacity than two trucks, each of which has half that capacity.

There is another side to this question: For city deliveries it may very possibly be better to use horse-drawn vehicles. In crowded districts a motor vehicle is constantly wasting power, and until traffic conditions in the large cities have been considerably reformed, this waste will be a constant factor in increasing cost of upkeep, consequently, where speed and distance are not requisites a horse vehicle may be the better paying proposition. One motor vehicle and one horse vehicle may be a better combination than two motors; two motor vehicles of equal capacity may be better than one motor of double the capacity; vice versa, one motor vehicle of high capacity may render better and more efficient service than two motor vehicles of half that capacity. These questions require deep attention. The question of transportation may be analyzed and the products of analysis arranged, positively and negatively. The latter should be eliminated, and the former will be the basis of a synthesis which will result in an efficient service of maximum worth at minimum cost, the Elixir Vitæ to anyone faced by the transportation problem.

The question of transportation should also he considered in conjunction with the other departments of a business. A more costly form of delivery may be an effective advertisement, paying back initial expense. Reliability of service has a great effect on a customer. Cost cannot be figured without considering the attendant factors towards efficiency. The cost of transportation should be elastic, and the overstretch capable of combination with other costs, to produce an efficient unit of *total* cost. A person will frequently pay double for exterior appearance or quickness of delivery and that extra amount of profit to the retailer will more than pay for the cost of special delivery.

Best Way to Figure Transportation Costs

From the tabulated reports it can be gathered that by far the best way to figure transportation costs is to separate them entirely from other branches of the business, otherwise a correct estimate cannot be obtained. Many times, in the course of this investigation, it was found that items that ought to have been included in transportataion costs were included in the records of other parts of the business. Thus, a true comparison of the respective merits of the electric and gasoline trucks and the horse vehicle cannot be formed. The preliminary estimate made by the Institute from the figures thus far obtained is, however, both interesting and illuminating. The preliminary estimate for parcel delivery shows that the total annual expenses of the three kinds of vehicle, electric, gasoline and horse, were $2,152, $2,576 and $1,679, respectively, representing investments of $2,200, $1,800 and $950. The horse vehicle does only two-

Table VIII. Comparison of Annual Performance and Expenses of Electric Trucks of Different Capacity

The average general performance and operating expenses of electrics have been approximated from the examples given in the first two tables. As will be seen, however, figures are not always forthcoming, so a correct comparison in these cases cannot be made.

	500 lb	700 lb.	1,000 lb	1,500 lb.	2,000 lb.	3,000 lb.	4,000 lb	5,000 lb.	6,000 lb.	7,000 lb
Performance—Annual:										
Miles	4,834	6,156	5,744	9,078	6,325	8,186	7,249	6,292	1,550	3,643
Kilowatt-hours	2,732	4,045	2,791	5,890	4,574	4,292	8,021		1,758	4,034
Days used		295	262	300	284	292	284	238		300
Days out of commission			23			26				
Trips								399		
Stops										
Weight of loads					1,501,900 Pound			1,659,000 Pound		
Operating Expense—Annual:										
Running repairs		$57.63	$141.33	$141.48	$107.20	$251.72	$196.62			$151.68
Lubricants	$6.01	11.63	12.44	19.32	13.29	19.44	16.64	$4.40	$5.88	17.28
Electricity	81.97		85.20		129.48	149.80	129.80	112.83	52.70	
Garage		278.53	292.62	296.80	233.74	186.90	271.24	120.00		280.08
Sundries		37.77	13.24	14.88	44.57	41.72	14.94	31.70		16.44
Driver		798.96	678.13	825.24	720.28	731.09	963.24	704.00		945.94
Battery		53.86	195.91	67.92	108.45	118.45	252.74		380.58	126.24
Tire	615.50		46.77	6.48	99.13	167.76	246.62	0.00	296.85	215.52
Overhaul		0.00	117.86	0.00	163.51	61.75		93.47	57.35	65.28
Painting						34.22	222.87			
Amortization		324.00	401.90	504.00	477.88	466.66	780.00	975.00		816.00
Administration		88.34	63.64	85.92	71.59	70.32	73.58			59.76
Interest			110.00			150.00		234.00		
Insurance			182.56		80.00	15.00		152.00		
Taxes						77.50				
Total Annual Expenses	$703.50	$1,650.72	$2,341.60	$1,962.04	$2,249.12	$2,542.13	$1,168.29	$2,427.40	$793.36	$2,694.12

thirds as much work per day as either of the motor vehicles, while if the cost per mile is considered, it is found that this works out at 21.5c, 26.0c and 23.5c, the cost per mile of the electric being less than the cost per mile of the horse vehicle. For coal delivery, the estimate is for the three kinds of vehicle, $3.792, $4.549 and $2,232 per year, and the cost per mile is 47 cents, 58 cents and 55 cents, respectively. These figures should not be considered as in any way definite; they merely serve the purpose of making an approximate comparison.

If an analysis of special conditions affecting transportation results in a two-sided argument, with no decisive weight on the part of the electric or of the gasoline, then the initial cost should be considered and also the question of the driver. It is easier to drive an electric than a gasoline truck. Many truck owners consider it a wiser policy to train their horse-vehicle drivers to become chauffeurs than to employ professional chauffeurs, who always require high salaries in comparison with horse-vehicle drivers. The latter are also more careful than the professional men and are not so ambitious of running the trucks at high rates of speed which, if frequently attempted with heavy loads, do more towards raising the costs of upkeep than any other item or any other usage.

Methods by Which Data Were Obtained

It is interesting to examine the means by which the Institute obtained the data from which it was possible to arrive at these conclusions. Special forms were sent out to the leading users of motor trucks in the principal cities, consisting of a series of questions from the answers to which the tables of initial cost and upkeep expense have been prepared. In many cases the forms were filled in with considerable care and fullness. But in other cases the expenses incident to transportation were so closely associated with general expenses that a correct estimate of some of the items could not be given. Definite units were taken as the basis of each calculation, in order that all forms might be comparable. The average number of months for which the data were obtainable was 14.5. Mr. Thomson visited the following cities: New York, Chicago, Pittsburgh, Philadelphia, St. Louis, Cincinnati, Cleveland, Washington, Detroit, Indianapolis, Rochester, Dayton, Newark, Lowell and Pittsfield. In addition, as mentioned above, nine representative firms in Boston are daily supplying information obtained by the tape record. Forty-five tapes per day are being received and are analyzed by the department, and in most cases the tape is forwarded with a detailed report of the journeys of the truck, furnishing a complete account of its diurnal adventures. The tape record is an admirable way for depicting graphically the movements of a vehicle. The line is traced by a pencil and records every movement of the wagon. Tables are then drawn up of average performances of a certain number of trucks for a stated period and the results compared. It is only by such systematic methods that a correct idea can be gained of the running expense of a commercial vehicle. After several of these forms have been prepared there will be a definite idea of the particular demands of each class of service. The records will be carefully studied and an endeavor made to eliminate as far as possible all unnecessary stoppages.

Investigating Delays at Freight Terminals

In addition, personal investigations are being made by the students of the handling of freight at the big freight terminals at Boston—those of the Boston & Albany, the Boston & Maine and the New York, New Haven & Hartford Railroads. Delays at such terminals cause more loss of money to truck owners than one might at first thought imagine, and it is only by careful inquiry and scientific suggestion, as a result of such inquiry, that adequate solutions can be found of the many problems surrounding the efficient handling of goods at the freight terminals and depots. In big cities the length of delays is a very important consideration, as the delay of one vehicle affects adversely a veritable host of other vehicles. Physical tests are also being carried out by the students of the department with regard to the special requirements of certain industries in the way of tires and batteries. These investigations, it is hoped, will result in the discovery of means by which the cost of such items may be reduced to the working minimum. Attention is also being paid to the wear and tear consequent upon the application of various anti-skidding devices which are being utilized by owners of motor trucks.

The investigation is being conducted in a thorough manner and the first report issued by the department gives a very good idea of the great value the final report will be to owners and presumptive purchasers of motor trucks and commercial vehicles, provided a little more specific information is forthcoming.

MUNICIPAL SERVICE EXTENSIONS

Schenectady Adopts Motor Tractor

AN example of the desire of fire departments to utilize as far as possible their horse-drawn equipments is shown by the Department of Public Safety, Schenectady, N. Y., in purchasing an Alco tractor which the department had specially designed for its use. This tractor is a 40 horsepower, four-cylinder chassis with 110-inch wheelbase and fitted with a fifth wheel over the rear axle. The purchase was for the purpose of drawing a Hayes aerial truck by the tractor, this being possible by removing the front wheels and gears of the horse-drawn truck and mounting it in the fifth wheel of the tractor. The aerial truck carries the usual hook and ladder equipment and to date has been drawn by three horses.

The Alco tractor, specially built for the purpose, uses an exceptionally short wheelbase and has an overall length of but 178 inches. It is equipped with solid tires 36 by 5-inch singles in front and 36 by 4-inch duals in rear. Its front and rear springs are 47 and 54 inches long respectively. It has a speed of 12 miles per hour.

Baltimore Makes Good Progress

MOTOR fire engines and hose wagons continue to make their way into the fire departments of Baltimore and of Baltimore County. During the past month the Baltimore department added motor driven hose wagons to Nos. 32 and 40 engine companies. Both of these hose wagons participated in a test of the high-pressure pipe line service together with the two high-pressure hose wagons and both made good showings. The high-pressure hose wagons have also proven their worth at several recent fires which had the tendency to spread to large proportions but were drowned out by the enormous streams thrown on the flames from these high-pressure wagons. All of these hose wagons are Mack vehicles, and they are equipped with high-pressure hydrants, which are also being placed on all the downtown hose wagons.

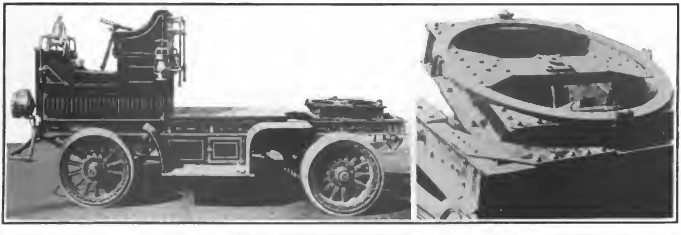
The Catonsville fire department of Baltimore County is also coming up to date with the addition of a new 110-horsepower American La France combination chemical pumping engine. The car is equipped with 1500 feet of 2.5-inch hose, 20 feet of 5 inch suction hose, a 40-gallon chemical tank, 200 feet of 1-inch chemical hose, three extinguishers, one 22-foot extension ladder and one 12-foot roof ladder. The pump has an outlet for three lines of hose and the pumping capacity is 800 gallons a minute.

Motorizing Minneapolis Fire Department

IN motorizing itself the Minneapolis fire department has two Seagrave squad wagons coming, $5140 each, and one air-cooled Seagrave in service to be replaced with a water-cooled machine. Each car will carry six men with driver and ladders sufficient to reach a dwelling house roof with hose and chemical equipment. The department also has a contract with the Nott Fire Engine Co. to take a triple-combination hose-chemical-pumping motor engine at $6500 with 500-gallon capacity a minute minimum, if it proves satisfactory. The department has just put in service three Cole roadsters, $1750 each, for district and assistant chiefs. The chief uses a seven-passenger Stoddard-Dayton and the first assistant a Rambler roadster. One Seagrave and two American La France squad wagons are in service. All engines are steam, horse-drawn.

The department placed in commission June 15 a five-man squad wagon built by the department on a Wilcox chassis. It has a combination chemical-hose service and short ladders, and is to run ahead of the first engine for emergency work. The car is on 90-day trial. If it is successful the department will pay $2040 for the chassis. The department was allowed $800 for materials to build the upper works from the bond funds. The materials cost $389.52 and the labor $513.69, paid for from the current expense fund, making the total cost $2943.21. While the truck is not so heavy as standard vehicles its load is evenly placed and is said to be a satisfactory product. The speed is 28-35 miles. It will carry 1200 feet of 2 1-2-inch hose in addition to the chemical equipment.

Chief C. W. Rinker has directed that motor apparatus shall run at not more than 35 miles an hour, which brings the new truck easily up to the standard. "It would cost $350,000 to re-equip the department," said Chief Rinker, "but will pay for itself in 5 years from the cost of maintenance of present equipment, and will increase the efficiency of the department 100 per cent. The apparatus stands an average of 23 1-2 hours out of the 24 in the stations and is not eating meanwhile.



New Alco Tractor for the Fire Department of Schenectady, N. Y.

Insuring the Commercial Motor Vehicle

How to Choose Insurance by Examining the Conditions Under Which a Vehicle Operates—Bringing Down Insurance Rates by a Co-operation Among Owner, Manufacturer and Insurance Company

Part IV—Choosing the Right Kind of Insurance

SHALL I pay a big annual premium and safeguard my truck, or shall I risk accidents and entirely ignore insurance?

This is the question which every truck owner must ask himself, and the only way to find a correct and sensible solution, based on the maximum of "least expenditure with greatest efficiency," is to sit down and figure. The truck owner should mentally divide his lines of thought into two groups: One focusing the probable risks of accident which will specifically affect his own truck; the other focusing the various branches of insurance with their premium rates, and the probable advantages to be gained by the adoption of one, two, or all kinds of insurance.

In the three previous articles of this series, the various kinds of insurance were detailed, and a brief outline was given of the effect of situation on insurance rates. In the present article, the problem which faces the truck owner will be analyzed.

Estimating the Chances of Accident

The first points to be considered by an owner when selecting his insurance are the special conditions which affect his truck; these having been found and arranged in natural order, he must estimate the possible chances of accident—arising from many causes, fire, theft, collision, overloading, excessive speed, etc.—to which those conditions render his truck most liable. He will then come to a conclusion as to whether it is necessary or not to insure his truck, and will be in a position to begin analyzing the various kinds of insurance applicable to the special conditions surrounding that truck.

The very idea of not insuring a truck actively engaged in transporting goods of value may seem absurd to some men, but, as was shown in previous articles, many business men of sound commercial standing prefer to run the risk of loss from accidents than pay the heavy premium required by the insurance companies; therefore it is quite logical to consider that the non-insurance of a truck may be a paying proposition.

As enumerated in the first article of this series, the kinds of insurance are as follows: Theft, fire and transportation; passenger privilege; personal effects; extra bodies; European trip privilege; collision, deductible average and full-coverage; damage to property of strangers by car; liability, and personal accident.

With these in mind, the truck owner should examine conditions. These may conveniently be arranged as follows: Type of truck; nature of goods to be carried; average daily amount of work required from truck; probability of capacity of load, whether too heavy or too light; knowledge, skill and temperament of driver; conditions of traffic in the city, town or country district in which the truck will operate; the presumable extent of the danger of theft from the truck; the probable necessity for high or low speeds; the special laws affecting insurance companies in the district in which the truck may be insured; the nature and extent of the manufacturer's guarantee; the construction of the garage; previous experience, if any, with motor vehicles, and with horse vehicles; and the price, age and horsepower of the truck.

The type of truck will affect the insurance. For some electrics there is a flat rate of 2 per cent.; with gasoline trucks the rate varies according to the original cost and age of the truck. Steam-driven trucks of present-year construction have a rate of 2 per cent., while models a year old have a rate of 3½ per cent.

Supposing a truck is carrying a valuable line of goods, it is almost a necessity that the truck should be well insured against possible damage from collision. The goods *themselves,* of course, should be insured against damage in consequence of fire or collision, and in such a case it is wiser to insure the car also against damage from collision, so that, in case of an accident, the expenses incurred may be minimized to their lowest degree. The kinds of goods to be carried may likewise necessitate the use of bodies of various kinds. It should be recollected that insurance must be taken out for the chassis and the highest priced body. Insurance can then be taken for additional bodies by the payment of a slightly increased premium.

The average daily amount of work required from a truck will materially affect the amount of wear and tear. It may be that the owner of a truck has a manufacturer's guarantee to pay all costs of repair for a year after purchase; the owner may estimate that at the end of the year his truck, owing to the very large amount of work it is necessary for him to get out of it during that period, will be reduced in value when the year terminates; consequently, he may come to the conclusion that the money which would be paid for premiums in insuring his machine might be used with far better value to himself as a good, substantial basis for the price of a new truck at the end of the succeeding year. On the other hand, if the truck is only used for very light work, and is at rest during half the day, he may consider it wise to insure his truck on all points and thus conserve its active life for the longest period possible. In coming to this conclusion, however, he should not forget the fact that the older the truck, the heavier the premium. This point will be considered more fully later.

Insuring a Truck According to Amount of Work

It is often necessary for an owner to slightly overload his truck; such a point may depend, if he is a retailer, upon the purses and wishes of his customers or the supply of raw material or the service of the wholesaler. He will find that this overloading is straining his truck and waging deadly warfare against the lives of his tires and motors; his truck presumably will not become patriarchal. He may, therefore, insure his truck for the active period of its existence, and thus eliminate the possibility of repair expense; or he may deem it wiser to forego insurance from the standpoint that the life of the truck would soon be over owing to the continual heavy strain. Such conclusions are entirely matters of personal opinion, founded on specific conditions.

The driver is one of the most important points to be considered; in fact, it has been suggested that the insurance companies should adjust their rates according to the proficiency and records of drivers. A careful driver will, in many cases, almost do away with the slightest element of risk of loss by accident. If an owner has a careful driver for his truck he may safely come to the conclusion that it will not be necessary for him to pay insurance premium to cover costs of repairing damaged property of strangers. He might also eliminate the collision clause, although in many cases collisions are due to the misguided efforts of others rather than to the driver of a vehicle. A certain firm in Ohio, for example, does not insure its motor truck because it considers that, with a careful driver, there is less risk of accident than in the case of a horse vehicle, and for the latter they never carried insurance. So much depends upon the driver's temperament. If he is a reckless man, with a decided taste for rapid traveling and a total disregard for every rule of the road, then the owner would be a foolish man who did not take every possible chance of meeting costs incidental to accidents. If the driver is passive, and puts the speed temptation behind him, then the owner may, with good judgment, lay by money which otherwise might swell the dividends of insurance corporations, as an emergency fund in case an accident should pierce the passiveness of his driver.

Effect of Traffic Conditions on Choice

If a truck is to operate in a large city where the traffic conditions render frequent accidents extremely probable, then collision insurance should be written, and also property damage and liability. The latter especially should be included, as even the most careful driver is at times beaten in his efforts to preserve the life of pedestrians by some foolhardy person. The cost of meeting claims consequent on accidents is heavy, and, in addition, there are expenses due to litigation to be met. If a truck is insured against accidents to persons, then the insurance company will personally undertake all legal proceedings and pay all costs and indemnities. In a small town this risk of running people down is not nearly so great, and according to the conditions of traffic so must an owner come to a conclusion as to whether or not it will be wise to take out a liability policy.

Necessity for Taking Liability Insurance

It is almost impossible to put by enough money as an emergency fund to meet the great expense consequent on an accident to a person. This may result in death, in which case the penalties are very heavy; and in any case, there are big costs for legal proceedings. It is a noticeable fact that many people consider that if they are accidentally knocked down by an automobile, and only slightly injured, they are on the way to obtaining a big fortune by way of damages. Internal injuries are easily assumed, and some people are not particularly conscientious as to the means of accumulating money. A truck may knock down a man and the man may get up and assure the driver that it was quite his own fault and that he is not injured in the least; yet on the morrow it is extremely probable that the owner of the truck will receive a communication from that uninjured gentleman's lawyer claiming a huge sum as damages against internal injuries. The truck owner does not know at all how to get out of the difficulty. His own attorney may be a man unacquainted with the nooks and crannies of insurance legislation, while his opponent has the whole codes at his fingers' ends. Thus, the probability is that the truck owner loses the case, and has to pay damages and costs.

If the truck owner carries liability insurance, he is safe.

Summary of the Various Kinds of Insurance for Motor Trucks and Delivery Wagons

Kind of Insurance	How Rated
1. Theft, Fire and Transportation	According to the Rate Schedule now used by the Automobile Underwriters' Conference, reproduced on page 23 of April issue. The figures are arrived at by an analysis of the results of previous years, and are so adjusted. Premium amounts for trucks of special prices shown in accompanying Chart I.
2. Riders to No. 1. To add: a. Passenger Privilege Clause	Add ½ per cent to the rate of No. 1.
b. Personal Effects Clause	Percentage added to rate varies according to will of insured, as to amount of compensation.
c. European Trip Privilege Clause	Add ½ per cent to the rate of No. 1.
d. Extra Bodies Clause	Percentage added according to kind and number of bodies. With one chassis and several bodies, insurance is taken for chassis and highest priced body.
e. Collision, including Damage to Property Clause	Collision claims can be of two kinds, $25 deductible average clause, in which $25 are deducted from amount of claim; and full-coverage clause, where full amount of claim is paid, but for which a higher premium has to be paid. Collision rates are arranged according to manufacturer, list price, and model, regardless of actual money value and age. Damage to Property Clause is rated according to horsepower and district of operation, arranged in three schedules.
f. To eliminate: Value Clause	Deduct ¼ per cent from rate of No. 1.
g. Theft and Value Clauses	Deduct ¾ per cent from the rate of No. 1 in the case of the present year models, and ¼ per cent in the case of other models.
3. Liability	Based on insurable horsepower (found from the formula $\frac{D^2N}{2.5}$, in which D=diameter of cylinder in inches; N, number of cylinders, and 2.5, a constant) of truck, and locality in which it is operated. Three district schedules are used, as in property damage insurance. This insurance protects for $5,000 if an accident results in the death or injury of one person, and for $10,000 if two or more persons die or are injured.
4. Riders to No. 2 to add: a. Collision Clause	According to manufacture, list price, model, and insurable horsepower, facts obtained from lists in the possession of the insurance companies. Also according to premium classes, which are three, classifying trucks of different body construction. There are two collision clauses — $25 deductible average and full-coverage clauses. This clause refers to damage to truck of insured.
b. Damage to Property Clause	According to the insurable horsepower and locality of operation. Districts are arranged in three schedules, the first having the highest rates, and the last the lowest. Variation according to insurable horsepower is shown in accompanying Chart No. III. In some districts where the risks are very small, the premium is less than the scheduled figure. This insurance cannot be written for sums less than $1,000. This clause only refers to the damage done by the owner's car to property other than his own, belonging to strangers.

It should be noted that collision and damage to property policies can be issued by fire and marine companies and casualty companies alike. But fire and marine companies, in most cases, are not allowed to issue liability policies, and vice versa, casualty companies are not allowed to issue fire, theft and transportation policies.

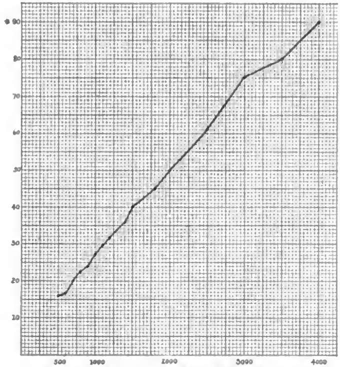


Chart I—Showing Variation of Premiums for Fire Insurance

From this chart it can be seen that the variation in premium is directly dependent on the original price of the truck. Consequently, the rates are strictly uniform, and have been estimated according to the experiences of past years by the insurance companies. These rates are used by all the companies belonging to the Underwriters' Conference, and when taking out insurance an owner can easily find out the rate for which his truck will be insured by the table which is sent him by the insurance company and which was reproduced in a previous article.

TABLE I.—SHOWING RATE FOR FIRE INSURANCE TAKEN ON TRUCKS COSTING FROM $500 TO $5,000 EACH AND AMOUNT OF PREMIUM TO BE PAID EACH YEAR.

Cost of truck	Rate	Premium
$500	3¼%	$16.20
600	2¾%	16.50
700	2¾%	19.20
800	2¾%	22.00
900	2¾%	24.70
1,000	2¾%	27.50
1,100	2¾%	30.20
1,200	2¾%	33.00
1,400	2¾%	38.50
1,600	2½%	40.00
1,800	2½%	45.00
2,000	2½%	50.00
2,500	2½%	62.50
3,000	2½%	75.00
3,500	2¼%	78.70
4,000	2¼%	90.00
5,000	2¼%	112.50

The whole matter is put into the hands of the insurance company; the insurance company employs thoroughly expert lawyers to probe into the evidence and put up a good case for the truck owner. Even if judgment should then go against him, the company has to pay the damages as well as the cost of litigation. To face such situations as these, an expert lawyer must be employed, and such a man the insurance companies have. Liability insurance nearly always repays premiums. The moral sense of security is also great, and is, with some people, worth much more than mere money.

If a collision policy is taken out, then the insurance company, in case of an accident, will pay all costs of repairing the truck.

If a damage to property policy is taken out the insurance company will, in the event of an accident, only pay costs of indemnity and legal proceedings and not costs of repairing the car, should such a proceeding be necessary.

It is hard to estimate the presumable extent of the danger of theft, but many owners consider it sheer loss of money to pay premium for an insurance policy protecting the truck in this direction. No policy can be taken out which protects a truck or car from theft on the part of direct employees; without any undue reflection upon the latter, however, it is more often the case than not that a theft is committed by inside men than out; the insurance companies recognize this by their refusal to issue policies. It may be considered fairly safe to ignore the personal effects clause altogether in the case of a motor truck; it really only applies to pleasure cars, in which valuable rugs and personal effects may be left from time to time; the motor truck driver does not drive round town garbed in robes of ermine.

It cannot always be blamed on an erratic driver that trucks are driven at high speeds; business conditions may possibly necessitate such. But it must always be borne in mind when considering the special kinds of insurance to adopt that high speeds shorten the life of trucks. This point, as it affects the choice of insurance, has been dealt with above.

As has already been related in the last article, special districts have special rates for the payment of insurance policies, and special laws affecting the granting of these policies. According to the district in which the truck is to operate, so will the rate be higher or lower. There are companies in some states that are not permitted by law to issue certain policies, so that a truck owner finds it necessary to take out policies with different companies, always much more troublesome than having dealings with one company only. He may, if he can secure better rates, insure his truck with a company in another district, provided that company has the right to issue policies in other states, but he must in all cases conform to the special laws of his own state. The choice of companies is, however, generally a matter of personal opinion alone, as all companies belonging to the Automobile Underwriters' Conference are on the same basis, while the companies outside the Conference, in most cases, adopt these fixed rates as well.

The construction of the garage is a good basis for considering the amount of fire insurance it is necessary to take out. There are certain rules for the construction of garages which have to be obeyed before the underwriters will issue fire insurance. These rules may not always be best from the viewpoint of the owner, and he may consider it better to build his garage in his own style, in his opinion perfectly fireproof, and eliminate the expense of paying a yearly premium in this direction. Or he may build his garage on the same principle as that laid down by the underwriters, considering those who have to pay for faults in construction as the best judges, and yet not pay premium for fire, on the ground that he has safeguarded himself by adopting a fireproof construction.

A man can always solve the insurance problem in a more thorough manner after some experience of truck and vehicle management. He can then estimate the average possibilities of accidents; he can form a true opinion of his driver's capabilities; he can better judge the situation in regard to traffic.

Two Courses Open to Owners

The price, age and horsepower all have their effect on the rate at which a policy is granted. The effect of each can be seen from the accompanying diagrams. It is generally better not to insure old trucks as the rates are so high, and it can be satisfactorily argued that age is a guarantee of good service and freedom from accidents.

Now the point arises as to whether it is better to insure a new truck with a company or to lay by a certain sum of money as an emergency fund in case of accident. The necessity for liability insurance in large cities has already been explained. Additional points besides those mentioned above must influence the decision with regard to the other kinds of insurance. The number of vehicles in operation is one of these. Insurance underwriters in some states grant reduced rates to operators of a fleet of trucks, if all the units composing that fleet are insured. Another point is whether the probable life of the truck will be sufficiently long to accumulate enough money to purchase a new truck on the demise of the first one. Past experience may dictate the choice. The one fact to be remembered is that either course is a paying one, as both have their supporters, men who have tested and found out on either side.

Owners often insure in quite a haphazard sort of way, without even reading the policy contract through. They do not know for what they are insuring, what clauses are included and what are omitted. In consequence, when they claim at the office, after some kind of accident, for compensation, they find that certain points have been omitted in the contract, perhaps those points affecting their special conditions of truck operation in their most vital part. This is an impossible way of doing business; it is exactly the same as buying a truck without examining its motor and other mechanical parts. Yet an insurance policy is not a hard thing to understand; if carefully read it will be found to be as clear as daylight to any ordinary understanding.

Variation of Insurance Costs

If the separate items which make up the expense list of a motor truck are each examined and compared severally, it will be found that the item of insurance varies considerably. This variation is, of course, due to the special conditions under which each truck is operated; therefore, it is practically useless to compare a large number of trucks in relation to cost of insurance, as only in the case of fire, theft and transportation insurance is there a fixed rate of insurance based on the initial cost of the truck. How the rate is arrived at in each case has been shown in a previous article; in this article, we illustrate, by a curve, the fire insurance paid for vehicles ranging in price from $500 to $4,000. Collision rates are based on such details as make of truck, etc., and vary also according to age. Liability and damage to property vary according to insurable horsepower.

It is useless to insure with two companies. In the event of an accident, each company is only responsible for half the compensation, as each holds but half the total insurance on the truck.

It would considerably relieve the owner, if all manufacturers and supplies of trucks took upon themselves the responsibility of guaranteeing their trucks for a period, say, of 6 months from purchase. This is done, as stated, in many cases, but the advantage of such a system would lie in its universal adoption. The manufacturer knows best the value of his truck and its capability for performing the work for which it is desired. Consequently, he is a far better man to undertake the insuring of the vehicle, with the least expense and the biggest chance of profit, than the new owner who has to accept the truck on the reputation of the maker. Also, if the maker had the responsibility of insuring his product after it was in the hands of the purchaser, he would be far more careful in influencing the buyer to purchase the truck most suitable for his requirements, as if the purchaser bought the wrong truck for his purpose, there would be

TABLE II—SHOWING AMOUNT OF PREMIUM AND RATE ALLOWED IN THREE TYPES OF TRUCKS AND INFLUENCE OF AGE ON AMOUNT ALLOWED

Cost of Truck	Amount of Insurancee	Rate	Age	
$2,000	$2,000	2½	This year	} Not less than 50%
	1,750	2½	Next year	}
	1,400	2½	Last year	Not more then 80%
	1,200	2¾	Year before last...	Not more then 60%
	1,000	3		
	800	3½		
	600	4		
	500	4½		
$4,500	$4,500	2¼		
	3,500	2¼	This year — next year model only	} Not less than 50%
	3,250	2⅜		
	3,000	2½		
	2,750	2⅝		
	2,500	2¾		
	2,250	3		
	1,400	4		
$3,000	$3,000	2½		
	2,750	2½	This year	} Not less than 50%
	2,500	2½	Next year	}
	2,250	2½	Last year	Not more then 80%
	2,000	2¾	Year before last....	Not more then 60%
	1,750	3		
	1,400	3¼		
	1,200	3½		
	1,000	4		

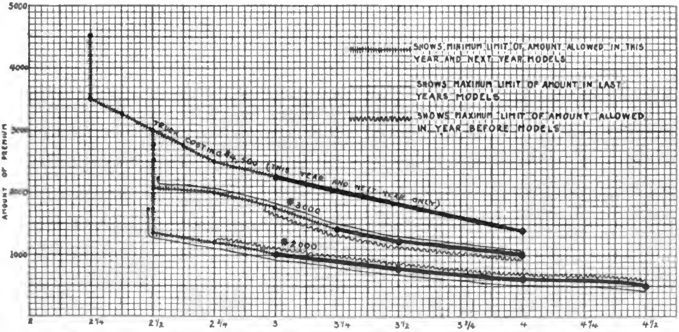


Chart II—Showing Fire, Theft and Insurance Rates and Amount of Premium in Trucks of Different Price; Also Effect of Age of Truck on Limit of Amounts Allowed

Some interesting information can be gathered by a close study of these lines. Each of the lines has a similar formation and affords evidence of the care which is taken by the insurance companies to arrange rates in strict proportion to their estimate of the value of the truck. In trucks of this year and next year there is a minimum amount, figured according to the age and cost of the truck, under which no insurance is taken. In trucks of last year and the year before last models there is a maximum amount, above which no insurance is taken for those special trucks. For trucks older than two years there are certain rates, but it is very hard to insure trucks of this age and few companies will take the risk.

RATE SCHEDULE NO. 1

Horsepower	Liability premium	Property damage premium $1,000 limit	Horsepower	Liability premium	Property damage premium $1,000 limit
16	$35.00	$10.00	38	$84.00	$21.00
17	39.00	10.00	39	85.00	21.25
18	43.00	10.75	40	86.00	21.50
19	47.00	11.75	41	87.00	21.75
20	51.00	12.75	42	88.00	22.00
21	54.00	13.50	43	89.00	22.25
22	57.00	14.25	44	90.00	22.50
23	60.00	15.00	45	91.00	22.75
24	63.00	15.75	46	92.00	23.00
25	66.00	16.50	47	93.00	23.25
26	68.00	17.00	48	94.00	23.50
27	70.00	17.50	49	95.00	23.75
28	72.00	18.00	50	96.00	24.00
29	74.00	18.50	51	97.00	24.25
30	76.00	19.00	52	98.00	24.50
31	77.00	19.25	53	99.00	24.75
32	78.00	19.50	54	100.00	25.00
33	79.00	19.75	55	101.00	25.25
34	80.00	20.00	56	102.00	25.50
35	81.00	20.25	57	103.00	25.75
36	82.00	20.50	58	104.00	26.00
37	83.00	20.75	59	105.00	26.25
60 H. P. and above				106.00	26.50
Electrics and motorcycles				25.00	7.50

RATE SCHEDULE NO. 2

16	$25.00	$10.00	38	$67.00	$16.75
17	28.00	10.00	39	68.00	17.00
18	31.00	10.00	40	69.00	17.25
19	34.00	10.00	41	70.00	17.50
20	37.00	10.00	42	71.00	17.75
21	40.00	10.00	43	72.00	18.00
22	43.00	10.75	44	73.00	18.25
23	45.00	11.25	45	74.00	18.50
24	47.00	11.75	46	75.00	18.75
25	49.00	12.25	47	76.00	19.00
26	51.00	12.75	48	77.00	19.25
27	53.00	13.25	49	78.00	19.50
28	55.00	13.75	50	79.00	19.75
29	57.00	14.25	51	80.00	20.00
30	59.00	14.75	52	81.00	20.25
31	60.00	15.00	53	82.00	20.50
32	61.00	15.25	54	83.00	20.75
33	62.00	15.50	55	84.00	21.00
34	63.00	15.75	56	85.00	21.25
35	64.00	16.00	57	86.00	21.50
36	65.00	16.25	58	87.00	21.75
37	66.00	16.50	59	88.00	22.00
60 H. P. and above				89.00	22.25
Electrics and motorcycles				20.00	7.50

RATE SCHEDULE NO. 3

16	$25.00	$10.00	38	$61.00	$15.25
17	27.00	10.00	39	62.00	15.50
18	29.00	10.00	40	63.00	15.75
19	31.00	10.00	41	64.00	16.00
20	33.00	10.00	42	65.00	16.25
21	35.00	10.00	43	66.00	16.50
22	37.00	10.00	44	67.00	16.75
23	39.00	10.00	45	68.00	17.00
24	41.00	10.25	46	69.00	17.25
25	43.00	10.75	47	70.00	17.50
26	45.00	11.25	48	71.00	17.75
27	47.00	11.75	49	72.00	18.00
28	49.00	12.25	50	73.00	18.25
29	51.00	12.75	51	74.00	18.50
30	53.00	13.25	52	75.00	18.75
31	54.00	13.50	53	76.00	19.00
32	55.00	13.75	54	77.00	19.25
33	56.00	14.00	55	78.00	19.50
34	57.00	14.25	56	79.00	19.75
35	58.00	14.50	57	80.00	20.00
36	59.00	14.75	58	81.00	20.25
37	60.00	15.00	59	82.00	20.50
60 H. P. and above				83.00	20.75
Electrics and motorcycles				20.00	7.50

TABLE III.—SHOWING EFFECT OF INSURABLE HORSEPOWER OF A TRUCK ON LIABILITY AND PROPERTY DAMAGE PREMIUMS

every chance of inefficiency and accidents, and the cost of these would have to be met by the manufacturer. He would protect himself by insuring the vehicle, but as the rate would be high, he would make a special point, in his own interest, of getting the right trucks on the right jobs.

After the lapse of 6 minths, the owner would have had enough time to gain an idea of the efficiency of his truck, and would be in a good position to judge of the extent for which it ought to be insured. He would then take out his own policy.

The insurance rates are high, because the risks are great.

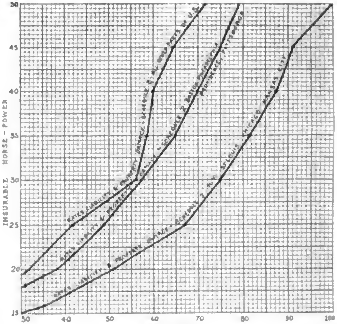


Chart III—Showing Property Damage Insurance Rates in Trucks of Different Horsepower

Property damage insurance rates are calculated according to the insurable horsepower. The latter is found by means of a mathematical formula. The rates vary, however, according to the district in which the truck is to operate, as some districts are more fruitful in producing accidents than others. By the Underwriters' Convention the United States has been divided into three separate districts and the rates prevailing in these districts are shown in the above chart.

The risks are great because so many owners at starting are incompetent judges of their own trucks, choosing trucks not suited for certain work, and either taking wrong insurance or none at all. The rating of insurance premiums is based on previous years' results; the previous years' results are, to a very large extent, dependent on the selection of the right sort of truck for a certain work; in selecting, the best guide for the owner, after the latter has made a thorough analysis of his whole transportation problem and formed a definite conclusion as to what he wants, is the manufacturer. But manufacturers are often more or less indifferent to the conditions surrounding their trucks *after* they have been purchased, and too frequently a salesman's motto seems to be "Sell on any line of argument; the only condition is—Sell."

If manufacturers guaranteed their trucks for efficient service in every capacity, and made it a personal matter that their customers should select the truck suited most to their purpose there would be an all-round competition for greatest efficiency; and maximum efficiency spells minimum insurance rates. That is the key to the insurance problem.

THE new Ahrens-Fox Continental motor piston pumping engine just installed by the District of Columbia commissioners for the use of the local fire department continues to give entire satisfaction. It will throw, under pressure, 900 gallons of water per minute. When tested it made 800 gallons, 100 more than the limit required.

Fire chiefs from a number of cities in the eastern and middle states have visited Washington, D. C., to inspect the new engine, several of them having been here a few days when the tests were made.

A motor fire engine is to be purchased for the protection of the million dollar estate of J. B. Haggin, near Lexington, Ky. This estate has suffered from several small blazes of late.

Commercial Car Questions Discussed

Exhaust Valves Not Seating Properly

EDITOR COMMERCIAL VEHICLE:—I recently had a troublesome experience with a motor truck as driver, which may be of interest to others who have not been driving long. The trouble was missing on one cylinder when pulling hard at low speeds on grades. Previously the motor had worked with the best satisfaction and pulled excellently, but suddenly, without scarcely any warning, it lost power and started boiling the water in the radiator, an experience I had never had before. I threw out the clutch and speeded up the motor and found it was firing on all four cylinders, but soon after starting again it started firing on three only. I next tested the plugs with a screwdriver, with the motor running at high speed and also at low, and all cylinders were firing. My next step was to test the compression of the cylinders by pulling up on the starting crank on each. I soon found that one cylinder had scarcely any compression, whereas the other three were in good condition. I looked to the valves as the means of finding the cause of the loss of compression. It was soon discovered by slowly turning over the starting handle and watching the valves open and close that one of the exhaust valves was not seating properly. Taking the valve out, it was found that there was a bit of carbon on the beveled edge of the valve. This carbon would not allow the valve to seat properly and so on every compression stroke a part of the gases would leak out and the mixture left was so low in compression that it often failed to explode. When running slowly there was more time for the gas to leak out and there was not an explosion in that cylinder, whereas on high speed there was not enough time for the gases to leak out and so all four cylinders were firing.

On one other occasion I had a somewhat similar experience, excepting that the motor missed on very high speeds. In looking into the trouble it was soon found that one of the exhaust valve springs was too weak and at high speeds the spring on the valve was not strong enough to close it in time and so the mixture escaped out into the exhaust manifold before the explosion occurred. The easiest way to verify a weak valve spring when missing occurs is to stick the point of a screwdriver between the coils of the spring and note if the missing does not cease. The reason of using this is that separating the coils of the spring strengthens the spring for the time being and as soon as the screwdriver is removed the missing will occur again.—AMATEUR, New York.

Overhang for Furniture Moving Truck

Editor Commercial Vehicle.—My truck is at present fitted with an open stake body, but as I desire to use it for moving household furniture, I am about to equip it with a van body. Will you inform me what amount of overhang the new body should have?—H. K. Tyler, Memphis, Tenn.

If you intend to place a standard size van body on your present chassis, it will probably be necessary to lengthen the wheelbase, as the standard wheelbase of a stake body truck is 12 feet and that of the chassis especially designed to carry a van body is 14 feet. The length of the van body on this model is 15 feet, measured from the back of the driver's seat, but, unless the motor is placed under the seat, the chassis frame overhangs the rear wheels sufficiently to equalize the distance from the driver's seat to the front wheels and allow for 1-foot overhang of the body from the end of the frame. This construction allows about 90 per cent. of the combined body and load weight to fall on the rear wheels. Care should be taken in putting a van body on your truck, to avoid all possibility of having too much overhang as this will tend toward placing too much weight on the rear of the truck. The results of too much overhang are many. But chief among them are the great strain on the entire truck and the rapid wear and short life of the rear tires.

Mileage Given by Average Solid Tire

Editor Commercial Vehicle—As I am thinking of purchasing a motor truck, I am investigating the various items of running expense. The most important of these, in my estimation, as compared with horse traction, is that of tires. The expense, of course, depends upon the mileage obtained from each tire, and as I have no way of determining this without actual test, I am writing to you to see if you can help me out on the matter. That is, could you inform me as to the approximate mileage given by the average solid rubber tire under ordinary conditions of service?—A. E. T., Syracuse, N. Y.

It has been computed that the average life of a solid rubber tire is about 11,000 miles when the truck is not driven at a speed exceeding 15 miles an hour and is not overloaded, but these are not considered ordinary conditions, as most drivers are strongly inclined to speed their vehicles and not a few owners or shipping clerks are not careful in placing and balancing the load. Road conditions also determine the life of a truck tire to a great extent, the figure given above being based on averages obtained over fairly good roads. To what an extent road quality is a factor may be determined from a comparison of the two following tables, the first being mileages shown by tires on some of the motor 'buses in London, England, where the roads and pavements over which they travel are excellent and the second being given out by a prominent tire manufacturer in the United States. The figures in the second column were taken from tire mileage obtained mostly in and around New York City.

The English averages for twelve tires are as follows:

Miles.	Miles.	Miles.	Miles.
31,951	32,036	37,847	38,616
31,951	33,148	37,847	40,508
32,036	33,148	38,616	40,508

The average for the twelve was 35,684.4. One reason, besides that of road conditions, why such a high average was possible, is that these vehicles are never speeded, an average speed of not more than 10 miles an hour being maintained. The English manufacturers make use of extra large sized tires, while in this country smaller tires than should be used are the rule. The mileage of American trucks is lower because of much injudicious application of the brakes.

The American averages for twelve tires are as follows:

Miles.	Miles.	Miles.	Miles.
7,000	15,000	8,320	10,000
8,000	8,300	8,320	9,000
9,650	8,300	9,000	8,000

The average for the twelve was 9,049. Taking into consideration the quality of the roads over which your truck is to run you should be able to form an estimate of the mileage you will obtain. Most tire dealers agree that in view of the present tendencies to overload, to speed and to use tires which are too small, an average of 8,000 miles is a good one. One reason for abnormal tire wear in America is the poor loading so common. This often happens in the wholesale grocery trade and the express loads in which the lighter weight parcels and packages are piled in the front part and the heavy barrels at the rear end.

MOTOR TRUCK CONQUERS IN NEW FIELD

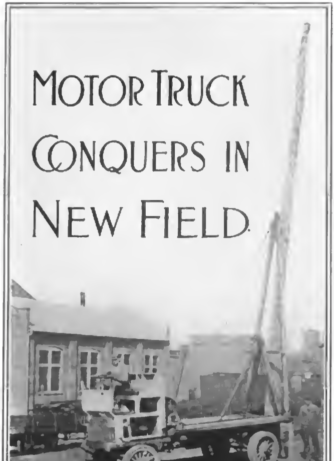


Fig. 1—The Mack Post-Hole Digger in the Act of Setting a Long Telephone Pole in the Hole It Has Just Dug

THE power of a motor in a commercial vehicle need not necessarily be confined to propelling that vehicle; it is an active force capable of being utilized in many ways and it is entirely at the will of the owner as to where and how such power may be directed. Loading and unloading may be considerably facilitated by devices drawing their power from the motor; it should always be borne in mind that in possessing a motor one possesses the best possible driving power.

There could be no better example of the ease with which the power generated by a motor car can be directed than the new apparatus, placed upon the market by the International Motor Co., for mechanically digging post-holes for telegraph and telephone poles, removing the earth and placing the poles in position.

The true test of all apparatus is found in the question: How much time and how much money does this device save? The new motor-driven digger has been tested, and before explaining the mechanism of the device it would be as well to find, from this actual example of work achieved, whether it is worth examination and adoption by municipal bodies.

At 7.10 on Tuesday morning, May 21, the No. 1 post-hole digger left the offices of the Bell Telephone Co. located at Seventeenth and Filbert streets, Philadelphia, in order to fix a certain number of telephone poles at Glassboro, N. J., a distance of 25 miles from the office. The digger was in charge of the truck driver, two operators of the drill and a gang of five men to set the poles in position. At 8.45 the scene of operations was reached. The digger was at once set to work and in 27 minutes from the start of the job the pole was in position; in another 30 minutes another pole was in the ground; two periods of 45 minutes each showed two more poles in position; the fifth and sixth holes were dug and the poles set in position in 25 minutes respectively; thus, the operation of fixing six telephone poles, each 35 feet in height, took 197 minutes, that is, 3 hours and 17 minutes, or 33 minutes each.

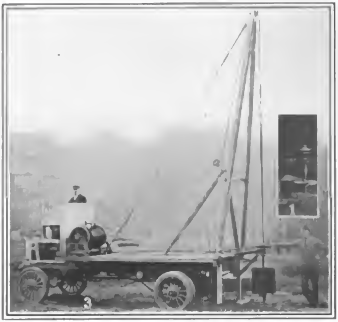


Fig. 2—Showing Post-Hole Digger in Actual Service. At 1 Is Shown the Digging Screw Out of the Earth, and at 3 It Is Just Lifting a Load of Earth

Under ordinary working conditions the motor digger can arrange in position two poles per hour. The additional time taken in the above test over fixing the third and fourth poles was due to some difficulty in arranging the derrick and the pole in position under thirty wires.

On an average one man can dig 10 holes in a working day of 10 hours. In addition to digging, the poles have to be set in position and the holes filled in. These operations are attended to by a gang of 9 men under the supervision of a foreman, and the time taken varies from 15 to 30 minutes. Thus, to set in position 10 poles it requires, under ordinary conditions of manual labor, a gang of 9 men and a foreman and the time taken over the job would be from 10 to 12 hours.

By means of the motor digger the same number of holes, 10, can be dug, and the same number of poles, 10, can be set in position in from 5 to 6 hours. Consequently, in 1 day, a motor digger will accomplish just twice as much work as a gang of 9 men and a foreman will. The motor digger is, also, operated by only 2 men.

In the first place, then, the motor digger saves each day one-half a day in time. How much will it save in money, in addition to the value of the time saved?

Digging Cost Very Small

Approximately it costs $42 per day to employ a gang of 9 men and a foreman to dig 10 holes and put in position 10 poles. The Bell Telephone Co. has estimated that it costs about $18 per day to operate the motor digger, this figure including the cost of salary of operators. Thus, the cost is practically one-third, and double the amount of work is done. The machine is worth while.

The mechanism of the motor digger is simple. The derrick is placed on the rear of the truck and is supported by a transverse beam, A, Fig. 3, passing right across the end of the platform. To this the boom of the derrick is attached by the two arms, BB, these two arms forming the top of the boom where they come together at C. Behind the boom is a triangular structure, D, likewise attached to the transverse beam, and having the same A-shape as the boom. At the top of this secondary structure, D, a cross-beam is attached, forming a means of preventing the boom from coming too far back, and also bearing a pulley arrangement, E, by which the rope from the winch drum is guided. One end of this rope it attached by a hook, F, to the head of the drilling apparatus, which is driven directly by the motor through the winch, G, and along an endless chain to the pulley, H, which has a threaded center, and is fixed to the bracket carrying the drill.

By means of the long screw, S, the drill is enabled to penetrate into the earth to a distance of 6 feet 6 inches. When it has reached this depth the gear shaft of the motor is reversed. This reverses the direction of the winch drum, exerting a pull on the rope, I, and extracting the drill from the ground, together with the earth attached, as in Fig. 2.

The drill itself, J, is about 1 foot in length, and is constructed on the ordinary screw pattern. At the top of the drill there is a spiral disk having a serrated edge. This revolves as the drill revolves and serves as a support for the core of dirt attached to the drill when the latter is withdrawn from the earth.

Lifting Pole and Placing It in Position

After the hole has been dug the rope is detached from the drilling apparatus at F, and the head of the boom is detached from the rope that holds it to the body of the vehicle. This lowers the boom to the ground. The pole is attached thereto, and if the motor is then started the power travels to the winch, and the winch revolves, lifting the boom and the pole. It can then easily be guided into the hole.

The winch is driven directly by the motor by means of an additional shaft running longitudinally from the gearset. At each end of this auxiliary shaft there is a worm, which at the forward end of the shaft meshes with either the first speed gear or the reversible gear of the motor. The worm at the other end of the shaft meshes with the main winch drum. Thus the power travels from the motor through the first speed gear by means of the forward worm to the auxiliary shaft, whence it passes a number of reducing gears to the main winch drum. The direction in which the winch drum is moving can be reversed simply by interlocking the main shaft with the reverse gear clutch. In addition to the main winch drum there is a smaller drum attached to the same shaft as one of the intermediate gears. This is used for hauling heavier loads than the large drum.

When drilling the hole the power sets in motion the winch, and turns the endless chain which revolves the pulley, H, at the same time turning the drill attached to the pulley.

Machine Is Very Compact

As can be seen from the illustration the apparatus is very compactly placed. At the forward end of the platform of the truck is the winch; at the rear is the derrick and the hole cutter, the latter being supported and attached to the chassis by a bracket, L.

To set the cutter at work it is only necessary to back the truck on to the curb, with the boom immediately over the position in which it is desired to place the hole.

The usual Mack 3-ton truck motor is used with the post-hole digger, a four-cylinder, four-cycle, vertical type, with 5½-inch bore and 6-inch stroke.

The derrick is 21 feet 8 inches high, and can handle the longest poles because, as they are heavier at one end than at the other, they can easily be manipulated with the lower and heavier end attached to the derrick. The derrick, without the cutter, can be used for numerous hauling operations as well, and has been so utilized by the Bell Telephone Co.

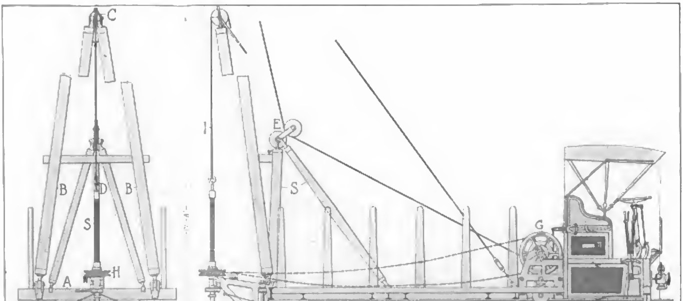


Fig. 3—Rear and Side Elevations of Mack Truck Used as Hole Digger. The Digging Apparatus Is a Screw, J, in Combination with a Disk, D, the Disk Aiding in Cutting the Earth and Also Being Used to Lift the Earth Out, as Shown at 1 in Fig. 2. The Screw J Is Driven from the Motor by a Chain.

Selling Motor Vehicles on Credit

Credit Terms Are the Only Means by Which a Dealer Can Sell to the Small Merchant—Active Employment of Capital Prevents the Latter from Making a Big Purchase

SMALL merchants are awakening to the advantages of motor wagons over horses in local delivery service. They represent good customers for moderate-priced light delivery cars. But they are often unable to pay cash for as expensive an appliance as the commercial car is. That business motor trucks properly applied to this field will practically pay for themselves in a reasonable time of service, is no longer doubted by those who take the pains to investigate; but the small purchaser is not in a position to raise the requisite sum for cash payment, with probable future performance as security. That the average small merchant is abundantly able to pay for a motor car if sold on credit, is not to be doubted in view of the fact that he is able to maintain horses and wagons, which are more expensive in upkeep for equal performance. The only question, therefore, is whether the manufacturer and dealer are able to grant him sufficiently deferred payments.

Grocers, bakers, launderers, hardware dealers, painters, florists, contractors, etc., represent a large and promising field for the sale of motor trucks, only beginning to be exploited. Every user of horses to any considerable extent is an ultimate prospect for the sale of one or more motor vehicles. To hope to sell to the majority of these on terms of cash is vain. Small dealers and tradesmen need, are beginning to want, and eventually will use motor vehicles in large quantities, and sellers who cater to this class of purchaser must make terms of which they may avail themselves.

Small Merchants Must Have Credit Terms

The sale of commercial cars on credit has not before been eminently necessary, and is necessary today only to a relatively small extent, but the time is not far distant when motor trucks will become structurally standardized, as wagons and carriages, and to a certain extent, pleasure automobiles; and the basis of competition will be less a matter of design and more a matter of terms of sale.

Small business is of necessity carried on under an exceedingly small margin, and therefore only small amounts of money may be safely taken from the business at a time. Investments in fixtures, stock, or equipment of small merchants or tradesmen are made in many instances on the installment plan. This is not because the small business man cannot raise the trifling amounts that many credit investments represent, but because of the very nature of his business. In any well-conducted business the way in which expenditures are made must be similar to the manner in which the income of the business is received. The small dealer is paid, as a rule, monthly on standing accounts, and consequently must meet his own obligations in like manner. The purchase of a delivery car represents the investment of from $1,000 to several thousand dollars, garage equipment included, and cash must be paid for its maintenance. Many a substantial dealer could not raise $1,000 and still continue business, and yet stands A-1 on the books of his creditors. To save the sum requisite to buy a motor truck out of his profits, would certainly be improvident, as lying idle in the bank his money could not possibly earn more than 3 per cent., while if put back into the business it should easily be worth three times that amount. But any responsible small tradesman or merchant can make monthly payments on his notes, of from $100 to $250. Especially as with the application of a motor truck to his business he could realize on the sale of his horses and wagons and on the economy effected by the motor. Therefore, the seller of this class of equipment in the small business field must sell on terms of credit. Responsible buyers should be able to raise sufficient for the first payments either in the form of loans or chattel mortgages on the horse equipment displaced by the machine. But to raise a sufficient amount of cash at one time to pay for the machine outright, would be a genuine hardship.

Credit Sales Made Whenever Necessary

That the average purchaser will adopt the latter policy is not to be expected, and although a few have done so, the trade is beginning to feel the effects of the reluctance on the part of circumspect business men to the making of large lump-sum investments. To meet this condition, dealers of commercial cars have already seen the necessity of granting terms of credit to a small but growing proportion of their customers.

Dealers are not today prepared to deny that a considerable increase of business would be enjoyed if more liberal terms of sale were granted to purchasers of small resources. The majority, as yet, are not quite settled in their views, but prefer to sell on cash as long as cash purchasers are to be found, deferring the granting of terms to a later epoch in the motor vehicle selling business. But it is an open secret in the motor truck trade that credit sales are made whenever necessary to responsible parties by practically every dealer in the trade, it being admitted by some of the best accredited and substantial agents and factory branches that as high as 75 per cent. of their total sales are made on terms of payment. While diametrically opposed to the expressed policy of most concerns, these sales are made on two accounts: (1) in order to sell the contracted number of cars, which in some cases is in excess of the number that can be sold for cash, and (2) as an exigency of competition.

Plans for Granting Credit

Experience along this line is, however, virtually experimental and to a large extent confidential, but as an experiment and undertaken at times, on one man's responsibility, it is remarkably successful.

In most instances where credit is granted, from a third to a half of the selling price of the machine is demanded as first payment, the balance payable in the form of 30, 60 and 90-day notes, a chattel mortgage being taken out on the machine by the sales organization or factory, to the extent of the notes. The purchaser usually is required to take out insurance against fire, collision and theft in favor of the mortgagee, to the extent of the payments due. Numerous variations of this plan are used, some preferring to take straight notes, which may be discounted at the bank with their own notes as collateral. In this case the mortgage is not needed, as the banks could not legally accept such paper as collateral. The latter plan is to be preferred to the former by the buyer, although not so secure for the seller, unless the buyer's notes are certified. Judgment notes are sometimes accepted, but their use is hardly advisable, as process of law is to be avoided at all times if the seller would have a good standing in his community. No really solvent merchant would give such paper.

Various plans of small installments have been tried, but they are not to be called successful, as the amount due is necessarily in excess of the marketable value of the car, second-hand. One concern does this in a conservative way, but admits that while it has a competitive advantage, one out of twenty of such arrangements is unprofitable. This, of course, adds unnecessarily to the cost to the rest of the buyers and is likely to breed enemies.

The sale of motor trucks and light delivery cars on partial payments is considered by many sales managers to be a commercial necessity. The larger motor manufacturing concerns must extend credit to small buyers to compete with the smaller and less substantial manufacturers. It is not often that such policy is regretted. Sales are often lost, however, because purchasers demand more leniency than it is a firm's policy to grant, but many more would be lost if no credit whatever were allowed.

Some Difficulties in Credit Arrangements

Naturally there are objections to and abuses of credit arrangements, as occasionally purchasers are found who refuse to make payments on the ground that they are not getting good service from the truck. Demands are sometimes made that the dealer make repairs and replacements that are not covered by the guarantee, being frequently the result of carelessness on the part of an incompetent driver. With as large an initial payment as cited above, however, no financial loss would be suffered by the dealer even if he were forced to foreclose on the mortgage. Tact and diplomacy, though, usually bring the purchaser to see his fault, for it must be remembered by both purchaser and dealer that the interest in the proper performance of the truck is mutual, and that therefore any disagreement must arise from questions of responsibility. This point cannot be emphasized too strongly, for no purchaser will invest from $400 to $750 in a machine and obligate himself to the extent of a like or greater amount, unless he believes in the truck and expects service from it. Neither is he apt to forfeit both the initial payment and the machine, after two or three months' use, when his neighbor can show him by example that the truck if well treated will do his work. Neither will a dealer sell a truck on payments that will not stand up under service, as to do so would not only embroil him in claims and law suits with his customers, but would ruin both his own and his truck's reputation. The same applies to the adaptability of a truck to a certain line of service.

But granting the feasibility of credit sales as regards safety to the seller and satisfaction to the buyer, the questions arise, (1) how is the relative responsibility of a prospective purchaser to be determined? (2) how is the seller to be sure of proper handling of the truck by the owner? (3) who is to take the responsibility of granting credit? and (4) what will be the effect on the stability of the industry? These questions have been carefully analyzed and considered with the following conditions:

(1) No iron-clad rule of credit can successfully be applied to all manner of purchasers, but the terms of sale must be adapted to individual cases. The plan of one of the most successful dealers on credit seems to be the most satisfactory solution of the problem yet advanced. This firm sells the majority of their cars on credit, hundreds of cars having been sold in this way, and apparently without the loss of a dollar. Having tried various fixed credit systems, and with indifferent success, owing to the fact that such plans were often too hard on some prospective purchasers, and too flexible for others, sales to responsible people being lost thereby and sales to undesirable purchasers being made, an experienced credit man was employed, taken from another line of trade, and the terms of sale were left to his discretion. Naturally a superior type of salesman is required to fill such a position, a man of broad-minded views and good judgment.

Selling Right Truck to Right Man

(2) The dealer must next be sure that he is selling the right truck to the right man and should be reasonably assured before making the sale that as applied to the service of the prospect, the car will give satisfactory returns for capital invested. He must next assure himself that the purchaser is acquainted with the necessary care and attention to secure satisfactory service from the truck. He should study the service of the purchaser and be prepared to point out where additional economy and efficiency may be derived from conditions indirectly related to the truck itself. He must bring to the understanding of the purchaser the fact that motor trucks must be operated at more than horse-pace to yield more in economy and facility than the horse. This represents a high class of salesmanship, but no other class will do for the sale of motor trucks on terms of partial payments.

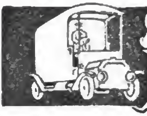
(3) On the question of who shall take the responsibility and thereby assume the financing, of a general credit system in the sale of commercial cars, rests the chief impediment to an immediate solution of the difficulty. The dealer cannot give credit to his customers unless he, in turn, is given credit by the manufacturer; the manufacturer cannot give his notes for materials, etc., with only the selling ability and discretion of his agents as security, nor on the other hand can he cover all of his territory with factory branches, which are the only mediums, so far, through which they have attempted credit sales. Manufacturer's creditors cannot be expected to stake the manufacturer with materials for such a new and unproven venture as they must regard the sale of motor cars on credit. Nor can the banks be expected to take the initiative.

Necessity for Concerted Action

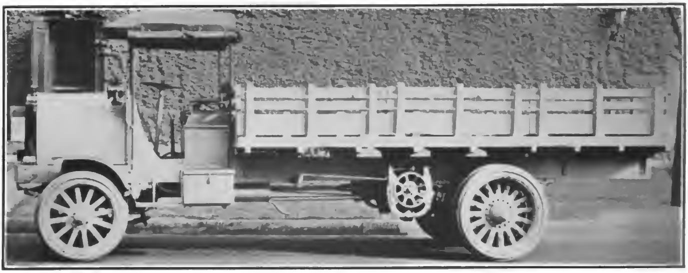
(4) Credit in the sale of motor trucks is now practiced and nothing should stop its continued practice. Furthermore, not to disparage the small but responsible manufacturer, for the larger and more substantial manufacturers to adopt a definite credit policy would do more to discourage "wild-cat" competition, so obviously harmful to the trade and counter to the best interests of stability and permanency of the industry, than any other single influence. The small manufacturer cannot build as good a car as cheaply as the builder of cars in large quantities. If the big manufacturer offers as liberal terms as the smaller the last stronghold of "wild-cat" competition is taken. That such a credit system will be inaugurated with the increase of demand is not to be doubted. But that either the manufacturer, dealer, or banker can bring such a condition about by his own initiative is not to be regarded as possible. The sale, generally, of motor trucks and delivery cars on a basis of credit can only result from concerted action on the part of all parties concerned.

The question is not: Can the seller of motor trucks afford to do business on credit? but: Can he long afford not to?

In conclusion, the fact of a practicable market for light commercial cars in the small merchant and tradesman field is no longer a question. That such sales must be made on deferred payments is inevitable. Much as some manufacturers and dealers may fear credit sales of motor vehicles, they are being and will be sold so and the concern who recognizes this fact and proceeds to capitalize it first is the one that will come out ahead.



The TRUCK MAKER'S MARKET



New Packard 5-Ton Truck with Right-Hand Control and Motor Located Under Forward Bonnet

Packard 5-Ton Truck

Detroit Company Introduces Heavy-Service Truck in Addition to Its Two Lighter Load Vehicles

Knox company reports on its motor oil-sprinkling wagon for municipal use, giving figures on a vehicle that has been in service for over a year. New type of funeral wagon in Pittsburgh service.

ONE of the latest additions to the list of 5-ton trucks made in America is the new Packard, recently placed on the market by the Packard Motor Car Company and which truck taken into conjunction with the company's 2-ton and 3-ton machines gives a line of vehicles covering a wide radius of load carrying. The new 5-ton vehicle is a standard Packard design, but uses a larger motor with 5-inch bore and 5 1-2-inch stroke as compared with the 4 1-2 by 5-inch motor in the 3-ton truck and the 4 1-16 by 5 1-8-inch one in the 2-ton vehicle. The motor of the 5-tonner is a special truck type with very heavy crankshaft, piston pins and other parts. It is equipped with a governor which regulates the speed on direct drive at 8.5 miles per hour.

As with the other Packard models the 5-ton truck follows that design with the motor located under a bonnet and having the driver with steering column mounted in rear on the right; and in spite of this design uses a wheelbase measuring but 14 feet. Instead of using different lengths of wheelbase the one length is standard, but there are three standard lengths of frame back of the driver's seat, these measuring 12 feet minimum, 14 feet standard and 16 feet maximum. Between 12 and 16 feet any length of frame measurement may be obtained.

The lengths of the clear loading space for the different sizes of bodies are as follows:

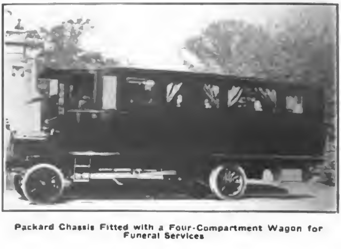
For the minimum frame length back of the driver's seat, namely, 12 feet, the length of loading space is 11 feet 7.5 inches.

For the standard body length back of the driver's seat, namely, 14 feet, the loading space measures 13 feet 7.5 inches.

For the maximum body length back of the driver's seat, namely, 16 feet, the load space is 15 feet 7.5 inches.

In all of the three body sizes the clear body width is 6 feet 9.5 inches. As yet the company has not developed its different body styles for this chassis, largely due to the fact that so much of the body business in the truck field is handled by special body building concerns.

The weight of a truck is always an important point and is a determining factor in the tire equipment. With the new Packard the weights of the chassis only are: Weight over front wheels 3,562 pounds, weight over rear wheels 4,604 pounds. When the chassis is fitted with a gate type of body



Packard Chassis Fitted with a Four-Compartment Wagon for Funeral Services as illustrated, the weight is 3,718 over the front wheels and 6,104 pounds over the rear wheels. The amount of overhang back of the rear axle is 60.5 inches. With its standard wheelbase the truck turns in a circle 60 feet diameter. The wheels are shod with tires 36 by 6-inch singles in front and 40 by 6-inch duals in rear.

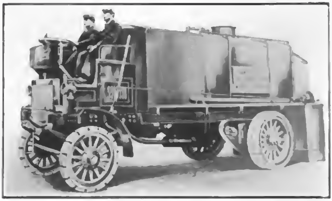
Motors for Russian Municipalities

MOTOR trucks are gaining prominence more and more regularly in Russia, one of the latest municipal uses being that for transporting sewerage and other refuse matter of a more or less liquid nature. The three wagons used for this work and illustrated herewith have each a capacity of 1,000 gallons, and for receiving and discharging loads of this kind they are pre-eminently suitable, since, in addition to the pumping gear, the motors which propel the vehicles also serve to fill and empty the tanks. The pumps are double-acting, air-type, capable of emptying a cesspool to the extent of what the tank will take within 5 minutes.

After much speculating and many trials and estimates for drainage, the Russian authorities concluded that the vehicles were the most necessary hygienic acquisition they could procure. The pumping mechanism lies between the forward end of the tank and the driver's seat. The chassis is the 45-horsepower, chain-driven N. A. G. standard subvention pattern, running in this case on wooden tires. Each rear tire consists of an oblong block mounted transversely and having two circumferential steel bands to hold the blocks in place. On the front wheels are smaller but similarly shaped blocks secured in place by a single band. The vehicles are fitted with standard right-hand control and are chain driven.

Motor Truck Used to Oil Roads

THE use of the motor vehicle for spraying oil under pressure on roadways and city streets has been exploited by the Knox company, through a special motor sprinkler cart which it has furnished the American Car Sprinkler Co., Worcester, Mass. The chassis is fitted with a rectangular-shaped metal tank having capacity for 1200 gallons of oil. The oil is forced from this tank at a pressure of about 140 pounds by means of a circulating oil pump driven direct from the transmission-shaft of the chassis. This pump forces the oil through a series of small nozzles in the base of a chamber at the rear of the chassis. This pressure insures a more even distribution of the oil than where it is sprayed by gravity. The oil pump is under direct control of a lever at the left of the driver's seat by which means the spraying can be entirely cut off, turned on, or regulated as desired. The vehicle operates at a speed of 8 to 9 miles per hour, and, according to the American Car Sprinkler Co., it is well suited for macadam roads. Last year over 350,000,000 yards of streets were treated with this machine.


Knox Chassis Fitted with a Special Body for Spraying Crude Oil on Roadways

The trucks are run at three different rates of speed. Most of the oiling, however, is done on the second or intermediate speed which develops between seven and eight miles an hour. These particular trucks are equipped with a sprayer that will oil eight feet of road at one time. However, the sprayer can be made any desired length.

The number of miles of road which can be oiled per day varies. It depends a good deal upon the distance between the base of supply and the piece of road which is being oiled. Two men are required for this operation.

The total over-all length of the vehicle is 18 ft. Other measurements are: wheel base, 149 ins.; tire size, 36 ins. x 6 ins. on the front wheels, 42 ins. x dual 6 ins. on the rear wheels; motor, 5½ ins. stroke; bore, 5½ ins.

No particular exhaust precaution is necessary, in fact the oil needs to be heated in order to spray properly. There is a pressure pump attached to the oil tank which puts pressure

Fleet of Three Municipal Wagons for Service in Russia. They Are Used for Emptying Cesspools and Municipal Cisterns

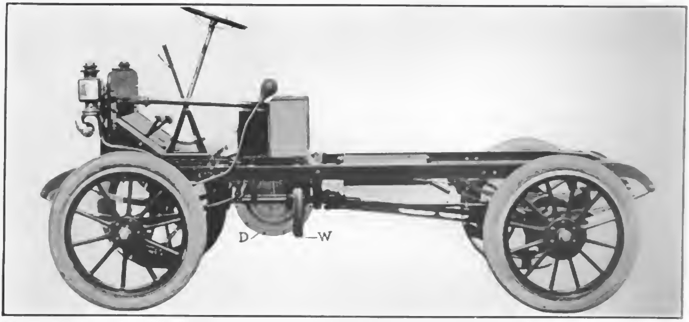


Fig. 1—Chassis of Wolverine-Detroit Light Delivery Wagon Showing Friction Transmission Set Made Up of Friction Disk D and Wheel W

on the oil and thus causes it to flow at a higher rate of speed than if gravity were used.

A Complete Funeral Car

A NOVEL funeral car has been completed for J. J. Flannery & Bro., Pittsburgh, Pa. The chassis is a Packard with a special body built by Giesenkamp Sons & Co., Pittsburgh. It is a single-unit vehicle having a compartment for the driver, one immediately in rear of it for the casket and the major part of the vehicle a carriage with accommodation for thirty-two persons. There is a fourth compartment for flowers, which is located above and in rear of the chauffeur's space. The vehicle is intended to serve as a complete funeral car.

The body, finished in dark panels with blank moldings, has the usual carriage finish. The chassis color is azure blue. The interior is oil-finished mahogany, the seats are upholstered in dark blue leather and the sides of the interior is the same leather.

The vehicle is lighted throughout by electricity and carries electric fans and telephone system connecting with the various compartments. Special fixtures include washstand, water coolers, etc.

The chassis was planned specially for the particular job and is shod with solid rubbers all around, single tires in the front and duals in the rear. There are three side entrances, one for each of the different compartments of the vehicle.

Pierce-Arrow Truck in Milk Service

New Detroit Vehicle

Wolverine-Detroit Wagon Uses Single-Cylinder Motor, Friction Transmission, Shaft Drive—Other Features

A NEW light delivery wagon coming from Detroit is the Wolverine-Detroit, an 800-pound vehicle built for either solid or pneumatic tires and fitted with friction transmission and shaft drive. This truck has been recently tested out over the roads and is now ready for the production stage.

Its power plant is a single-cylinder, vertical, four-cycle motor with 4.5-inch bore and 5.5-inch stroke. As Fig. 2 shows, this motor is uniquely located on the right side of the chassis under the driver's seat, the friction transmission set being located on the left side beneath the driver's seat, thereby leaving nothing beneath the load-carrying platform but the propeller shaft which is close to the left-hand side of the vehicle frame.

The Wolverine-Detroit has a load capacity of 800 pounds, there being a body-carrying space 64 inches long back of the driver's seat. This load space is 40 inches wide. Any type of open or closed body can be fitted.

The vehicle has left-hand control centering in a steering pillar carrying throttle and spark controls on the wheel. There are two pedals and a speed change lever, the latter operated by the left hand. The vertical tube radiator is carried in front of the dash.

While simple so far as power plant and transmission goes the Wolverine is a carefully built vehicle. The frame is a channel steel construction with cross subframe members for carrying the motor, steering gear and control parts. This framework is carried through semi-elliptics front and rear, each set 40 inches long with leaves 1¾ inches wide. The front axle is an I-beam Timken design and the rear axle is a Timken type with nickel steel shafts and gears and carrying internal brakes on the hubs. When pneumatic tires are fitted the sizes are 32 by 3.5 inches all around and when solid tires are fitted the size is 34 by 2.5 inches.

The motor is a conventional water-cooled type with thermo-syphon circulation. It uses an L-type of casting with integral waterjacket and a plate for covering the valve springs. Two mechanical valves are operated, intake and exhaust being of the poppet type 2.25 inches in diameter. Babbett-lined bearings are used for the crankshaft and connecting rods. Lubrication is by a constant level splash system in the crankcase. Ignition is by jump spark with coil and dry cells.

The friction set illustrated in Fig. 1 consists of a metal-faced disk D forming the flywheel and the friction wheel W, which can be moved fore and aft on its shaft to give the different forward speeds and the reverse. The disk is backed up by a large ball-thrust bearing. The friction wheel shaft is carried in two annular ball bearings. This shaft connects direct with the propeller through a Spicer universal joint.

An Accurate Daily Record of Truck Work

Seldom is an accurate record of work done by a motor truck day in and day out been kept, but it has been found possible in the instance of a Pierce-Arrow, worm driven, of 5 tons capacity, that is owned by Towar's Wayne County Creamery of Detroit, Mich. The routes taken by this truck every day and the loads carried do not vary materially, and because of this condition it is possible to show just what the truck does, how many wagons it has replaced and the daily mileage, which is kept down owing to the numerous stops made. Two shifts of men are employed to operate the truck, owing to the long hours of service.

The truck leaves the garage at 3:00 A.M. and does not return until 12 midnight, making 21 hrs. service daily through the week and 12 hrs. on Sunday.

It leaves the Towar factory every morning with a load of wholesale bottled milk and cream which it distributes to the grocery stores and factory dining rooms on the east side of Detroit. It takes from 3:00 A.M. to 1:00 P.M. to peddle this load and make collections, etc. The truck, of course, brings back empty bottles and crates which weigh about 3 tons. It formerly took 3 teams and 1 single wagon to do this work.

On the truck's return to the plant at 1 o'clock it makes 2 trips to the railroad stations for milk, loaded with 5 tons each trip. The second driver takes the truck at this time, 2 o'clock.

The truck now makes a trip to the north end branch, a distance of 4 miles, with a full load of bottled goods to be delivered the following day by the wagons stationed at this branch. On the return trip it has a full load of empty bottles weighing 4 tons. The truck then makes another trip to this branch with the same load. Upon its return at about 6 o'clock the crew has its lunch. Two trips to the railroad depots for supplies follow lunch, then 1 trip to the east side branch, a round trip of 10 miles. Upon its return from the east side there is usually another trip to the railroad station.

The afternoon and evening loads are all 5-ton loads with occasionally an overload of ½ ton. Mr. Towar estimates that it would take 5 large teams to handle this afternoon and evening work, while now it is done with 2 men on a Pierce-Arrow truck.

The morning load consists of:

Case Milk.		
648 quarts milk	54 cases at 59 pounds	3,186 pounds.
1,800 pints milk	90 " " 55 "	4,950 "
100 half pints cream	5 " " 41 "	205 "
40 pints cream	2 " " 55 "	110 "
60 quarts buttermilk	5 " " 59 "	295 "
Bulk Milk.		
5 cans milk (10 gals. each)	110 pounds each	550 pounds.
6 " " (5 " ")	54 " "	324 "
5 " " (3 " ")	29 " "	145 "
10 " " (2 " ")	21 " "	210 "
Total load		10,075 "

Ninety-five 10-gallon cans of milk is a load for depot hauling, a total of 10,450 pounds. The daily mileage of this truck is between 50 and 60 miles.

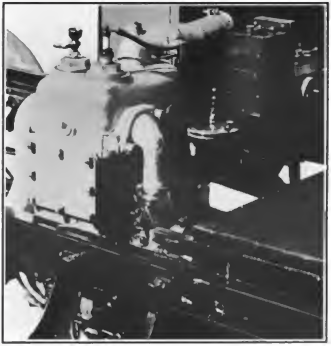


Fig. 3—Single-Cylinder Motor of Wolverine-Detroit Light Delivery Wagon Showing Enclosed Valves

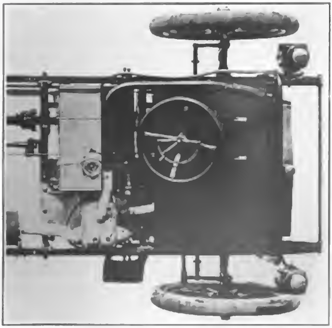


Fig. 2—Front End of Wolverine Chassis Showing Single-Cylinder Motor Mounted Close to Right Side with Gasoline Tank at Its Left. Left-Hand Control Is Used. The Friction Transmission Is Located Under the Gasoline Tank

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ONE repeat order for 30 motor cars has just been received by the Garford Company, of Elyria, O., from the Parmalee Co., the largest livery concern in Chicago. For more than a year the Parmalee Co. has been using this type of machine.

These motor carriages are an improvement over the ordinary taxicab and the Chicago public has come to look upon them with much favor. They are built on the standard 30-horsepower chassis. Since the first motor carriage was put in service an accurate system of cost accounting has been in operation and it shows that the cost of maintenance is much less than expense incurred by using cheaper vehicles.

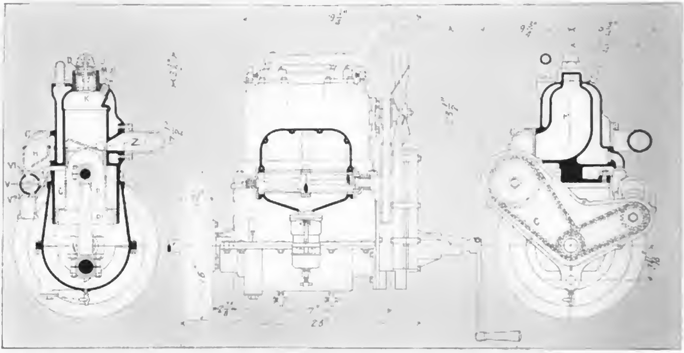


Fig. 1—Sections of Two Ends and Side of Tuttle Two-Cycle Motor Showing Double-Diameter Piston, Chain Drive for Motor Shafts and Dimensions

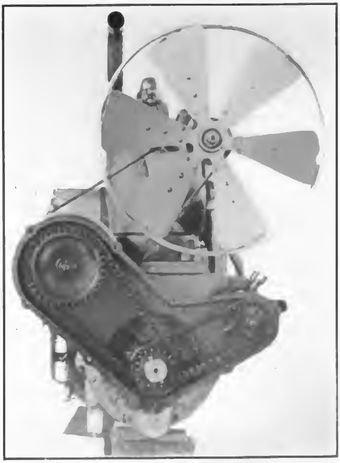


Fig. 2—Front View of Tuttle Two-Cycle Motor. The Rotary Valve Is Driven by Silent Chain at One-Half Crankshaft Speed, the Valve Being an Iron Casting of Tapered Form and Finished by Grinding. It Is Housed in an Aluminum Casting, in which it Revolves on Parson's White Brass Bearings Which Are Finished on Same Taper as Valve and Provided with Spring Adjustments to Take Off Wear and Insure a Gas-Tight Construction

Tuttle 2-Cycle Motor

New Truck Motor Pumping Piston Used to Inject Mixture Into Cylinders to Obtain Higher Efficiency

A COMPRESSION-feed type of two-cycle engine for truck use has been put on the market by the Tuttle Motor Co., Canastota, N. Y. The two-cylinder motor is a vertical block-casting design in which crankcase compression is not made use of to force a charge of explosive mixture into the combustion chamber, but in which a double-diameter piston is used, the lower and larger diameter portion acting as a pump to inject the explosive mixture into the combustion chamber. To further assure positive action in getting the mixture into the cylinders the use is made of a rotary sleeve valve acting between the carbureter and the pumping portion of the piston; and between the pump chamber and the combustion chamber there is an automatic inlet valve located in the cylinder head. There has thus been made in this motor no effort to get entirely away from the valve construction, rather the company has aimed to insure a full charge of pure explosive mixture into the combustion chamber for each explosive. The aim has been efficiency rather than reduction in number of parts. The motor has cylinders 4.5 by 5.5-inch bore and stroke.

The three parts of Fig. 1 best explain the Tuttle construction. The left portion of this illustration shows a vertical end section of the motor with the double-diameter piston, the small diameter portion P corresponding with the piston in the conventional gasoline motor and being known as the working piston. The lower portion Pt, of larger diameter, is known as the pumping piston. The position of the rotary valve V between the carbureter and the pump chamber C is shown as is also the automatic intake valve K in the cylinder head.

The modus operandi of the motor is briefly as follows.

On the down stroke of the piston one port, V2 on diagram, registers with the intake passage I so that mixture is drawn into the annular pump chamber C. On the up stroke of the piston the port V1, the rotary valve, establishes a connection between the passage I and the pressure chamber H; into the latter the mixture from the chamber C is forced by the pumping piston P1. As soon as the opening of the exhaust port Z on the explosion stroke has reduced the pressure in the combustion chamber below that in the compression chamber H the automatic intake valve K is forced open by the inrushing charge from H and it is held open until the piston P on its upward stroke has equalized and pressure in the combustion chamber with that in the compression chamber H. It is stated that under full load this will not occur until some time after the exhaust port Z has closed.

To further analyze the working operation of the Tuttle motor the right illustration in Fig. 1 shows how the rotary valve V is driven by silent chain C at one-half crankshaft speed. The valve is an iron casting of tapered form and finished by grinding. It is housed in an aluminum casting Fig. 2, in which it revolves on Parsons' white brass bearings, which are also finished on the same taper as the valve and they are provided with spring adjustments to take off wear and insure a gas-tight construction.

The automatic intake valve K is a conventional poppet type. Its action is entirely controlled by a piston J attached to the valve stem and working in the small cylinder D on the top of the valve cage, and also through a small spring of just sufficient strength to hold the valve on this seating. In operation the opening of the valve is stopped at the proper place by the piston J coming into contact with a hard felt washer M in the bottom of the cylinder D. On its upward or closing movement the valve speed is controlled by an air cushion within the cylinder and above the piston J. This, it is claimed, causes a light seating with freedom from noise.

The positiveness of the pumping of mixture into the combustion chamber is due to the fact that the cubical capacity of the chamber C is larger in volume than that of the combustion chamber situated above the working piston. It is claimed there is no time when the whole charge delivered by the piston P1 to the compression chamber H will not be forced into the combustion chamber because any surplus remaining in the compression chamber H will increase its pressure to any amount that may be required to use the full charge at all times. It is by this scheme that the explosive mixture does not enter the crankcase as is so frequently the case with two-cycle motors.

In lubricating the motor a splash level is maintained in the crankcase which oils the crankshaft bearings, and the upper and lower connecting rod bearings. Oil is introduced to the crankcase through the breather pipe, Fig. 3. On the rear end of the carbureter side is a float gauge indicating the oil level in the crankcase. The rotary valves and pistons are cared for by mixing oil with the gasoline in a ratio of 1 to 40, that is, 1 pint of oil to 5 gallons of gasoline.

The constructive details and dimensions of parts are shown in Fig. 1. The block cylinders in construction are heat treated after they are bored to relieve warping strains and are finished by grinding. The crankcase is an aluminum alloy 92 per cent. aluminum and 8 per cent. copper. The crankshaft bearings are carried in the upper half. Each working piston carries four compression rings and each pumping portion three. Connecting rods are manganese bronze. The crankshaft is made from .35 to .45 carbon steel with all bearings 1⅝ inch in diameter. The crank shaft and lower connecting rod bearings are Parsons' white brass. A water pump is fitted.

WITH the addition of two more Packard patrols to its equipment, the Detroit police department rounds a public safety squadron that ranks among the best in America. The rear wheels are being equipped with 7-inch pneumatic tires, marking another step in the evolution of a motor vehicle adapted to the slap-bang continuous service of the police. The first set of 7-in. tires is in good condition after 5000 miles. There will now be 11 Packards in the Detroit police department.

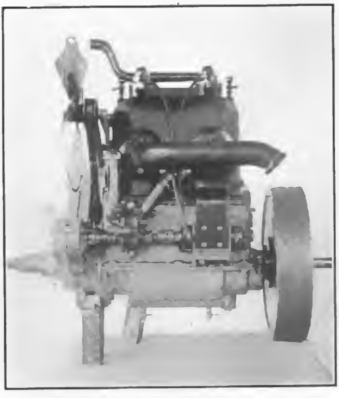


Fig. 3—Exhaust Side of Tuttle Compression-Feed, Two-Cycle Truck Motor

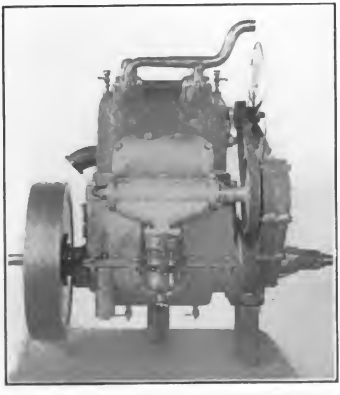
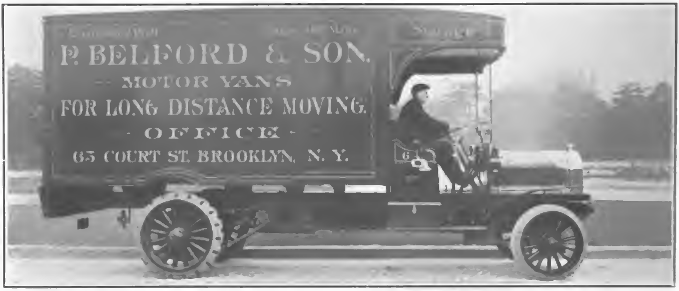


Fig. 4—Intake Side of Tuttle Two-Cycle, Compression-Type Motor with Rotary Intake Valve

TRADE and PERSONAL ITEMS



Typical Storage Van Body Design in Brooklyn Service

The Cleveland Hardware Co., Cleveland, O., has issued a catalogue describing its plant.

R. C. Chidester has been appointed manager of the Packard Motor Co., at Milwaukee, Wis.

Lippard-Stewart Motor Car Company, Buffalo, N. Y., has issued a catalogue describing their trucks.

The Autocar Co., Ardmore, Pa., issued a catalogue showing their different styles of motor trucks.

G. H. Duck has been appointed manager of the New York branch of the American Lomotive Co.

Mercury Manufacturing Company, Chicago, sent out a booklet showing their different style trucks.

Bowling Green Motor Car Company, Bowling Green, Ohio, issued a catalogue showing their "Modern" trucks.

Henry C. Colgan of the Waverley Electric Co., Louisville, Ky., has succeeded Wright Barr as manager.

The Locomobile Co. announces the death of Frank P. Day, manager of the Atlanta Branch of this company.

Baldwin Chain & Mfg. Co., Worcester, Mass., is sending out a catalogue illustrating their chains and sprockets.

R. J MacKenzie, formerly assistant general manager for the Alden-Sampson Co., has joined the Kelly Motor Truck Co.

H. A. Lozier has announced that the Lozier company will not be able to make delivery on 5-ton trucks until next winter.

Harwood-Barley Manufacturing Company, Marion, Ind., has issued a catalogue describing various styles of motor trucks.

Atlantic Vehicle Company, New York City, has issued a catalogue giving specifications and views of their electric vehicles.

Wright Barr of the Waverley Electric Co., Louisville, Ky., has accepted the position of special factory representative.

Westfield Motor Truck Company, Westfield, Mass., has sent out a catalogue illustrating several styles of motor trucks.

A. M. Pearson, Locomobile Co., has charge of the new service station in Baltimore, which has been recently established.

Perry Rockwell has been appointed general advertising manager of the United States Motor Company, succeeding Gridley Adams.

Arthur Gibbons has accepted a position with the Chicago branch of the Velie Motor Vehicle Company in the truck sales department.

F. J. Haynes, factory manager for the H. H. Franklin Manufacturing Company, has resigned to accept a position with Dodge Bros., of Detroit.

Frank H. Jones has accepted the position of general superintendent of the Muncie Gear Works. He was formerly connected with the Warner Gear Co.

A motor vehicle line will be established between Owensboro and Hartford, Ky., shortly. This will be a combination passenger and delivery service.

R. S. Hartzell, of the Detroit branch of the Goodyear Tire & Rubber Co., will travel through Michigan representing the motor truck tire department.

Jerome Ingersoll has joined the Baker electric forces and will have charge of the Detroit, Mich., store, as well as the distribution system of the company for Michigan.

Howard E. Wagner, recently sales manager for Wyckoff, Church & Partridge, Inc., has accepted a similar position with the Buffalo Electric Vehicle Co., Buffalo.

Sewell Cushion Wheel Company, Detroit, Mich., has sent out a booklet entitled "The Wheel Within a Wheel," showing their wheels on various styles of motor vehicles.

Fred F. Colver has been appointed manager of the New York branch of the Locomobile Company's new truck department. He will have charge of the Metropolitan field.

Jacob Haish Mfg. Co., Dekalb, Ill., has established a motor truck freight line over a 26-mile route between Dekalb and Sandwich. This company has three trucks in operation.

S. L. Buchanan and T. D. Lovering of St. Paul, Minn., owners of the Motor Truck Co., have bought the lease of the Genge Power Vehicle Co., which handles the Grabowsky truck.

Oliver C. Hutchinson, manager of the Marquette Co., has been promoted to succeed W. J. Mead as vice-president and general manager of the Olds Motor Works, Lansing, Mich.

The General Motors Company, Detroit, Mich., has recently brought out their new sight-seeing car. It closely resembles the pleasure car and comfortably seats 16 people.

Argo Electric Vehicle Company, Saginaw, Mich, has on the market what is known as the Non-Reversible Wheel Steering Apparatus. This is so adjusted as to be easily operated.

B. F. Fitch, who has been selling agent for the Autocar and Morgan trucks in Louisville, Ky., has been made factory sales representative by the Autocar Co., with headquarters at Chicago.

George Morgan, formerly Detroit representative of the New Departure Manufacturing Co., of New Britain, Conn., now represents the Hess Spring and Axle Co. in Indianapolis.

Major L. M. Fuller has resigned from the Velie Motor Vehicle Co., where he was general manager and secretary, and has accepted a position as head of a new department with the Bausch & Lomb Optical Co.

Wilbur F. Reynolds, sales manager Lippard-Stewart Co., has assumed the duties of advertising manager in connection with the supervision of the sales department, under the title of sales and advertising manager.

A. M. Pearson, formerly of the Packard, White and Gramm companies, has been appointed manager of the truck department of the Locomobile Company of America, covering Philadelphia, Baltimore and Washington.

Two more freight and passenger motor vehicle lines have been established in Maryland. One of these is operated from Baltimore to the Baltimore county line at North Branch. The other line runs from Libert to Baltimore.

E. H. Bull, recently with the New York Leather Belting Company, has been appointed district sales manager in charge of the Northwestern territory for the Franklin Automobile Company. Headquarters will be at Denver, Colo.

Merrit J. Osborn, agent for White cars in St. Paul, has taken over the garage of the Western Automobile Co., 383 Cedar street and will use it for its pleasure car business and the present garage at 15 E. Ninth street for its truck business.

Universal Motor Truck Co., Chicago, has under way plans for the erection of a new $75,000 maintenance garage and salesroom. This company has plans to erect the same kind of buildings in St. Louis, Kansas City, Minneapolis, San Francisco, New York and Boston.

Muncie Gear Works, Muncie, Ind., is constructing a new factory building. This plant will be used for making transmissions, steering gears, levers and differential gears as well as jack shafts and sprockets and also cut gears for both commercial and pleasure cars.

A motor vehicle line from New Amsterdam to New Albany, Ind., a distance of about 30 miles, will be established in the near future. The men interested in the proposition are John Windell, Ray Trotter and Dr. D W. Hays. There is not a railroad running between the two towns.

United States Rubber Company has under way plans for the erection of another plant. This company has at the present four immense tire plants. Announcement has also been made to the effect that the capital stock of this company will be increased from $75,000,000 to $120,000,000.

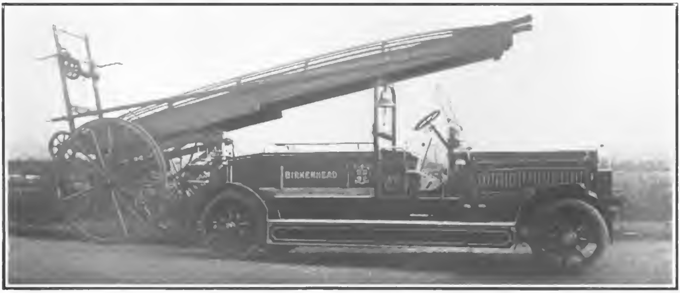
The Ford Motor Co. has bought a site in Minneapolis for a northwestern truck and motor car assembling and distributing plant. Heretofore the Ford has been handled in the territory through an agency, which will continue in business indefinitely. The branch house will be ready about October 1 and will cost about $250,000.

General Motors Truck Company, Detroit, Mich., reports business during the month of May as being exceptionally large in all of the important trade centers. The following orders were received from the Adams Express Company for 12 3½-ton trucks and Shepard-Norwell Company of Boston for 10 1½-ton trucks, to be delivered at once.

The following concerns were recently elected to membership in the Automobile Trade Credit Association: Bossert Company, Utica, N. Y.; John T. Stanley, New York City; Lumen Bearing Company, Buffalo; Worcester Pressed Steel Company, Worcester, Mass.; K. W. Ignition Company, Cleveland; Globe Machine & Stamping Company, Cleveland.

A recommendation of Building Inspector Norris Hacker, to the District Commissioners, that the building regulations be amended so as to permit the establishment of public garages in squares already occupied by a public garage or livery stables, without the necessity for securing the consent of adjoining property holders, has been approved. Inspector Hacker thinks that such a provision would tend to colonize the garages in certain squares.

Harwood-Barley Manufacturing Company, Marion, Ind., during the last week in May sold trucks to the following firms: Spencer-Hogin Fruit & Grocery Company, Marion, Ind.; The Jackson Regal Company, Jacksonville, Fla.; The John Kelley Furniture Company, Marion, Ind.; Rhodes-Futch-Collins Furniture Company, Jacksonville, Fla., and Union Liberty Furniture Company, Chicago.



Gasoline Tractor for Fire Department Service with Aerial Ladder

Recent Incorporations in the Commercial Vehicle Field Throughout America

Automobile-Vehicle Corporation, Buffalo, N. Y. Capital $20,000. Incorporators: L. A. Kenyon, Frank H. O'Neil and Otto A. Hagelin.

The K-D Motor Co. (Knight-Davidson Motor Co.), New York City. Capital, $100,000. Incorporaturs: Margaret E. Knight, Anna F. Davidson and Beatrice M. Davidson.

Stewart Motor Corporation, Buffalo, N. Y. Motor car business. Capital, $250,000. Incorporaturs: Charles J. Bork, Bernhard L. Fischer and William F. Strasmer.

Waite's Motor Cars & Storage Co., New York City. Capital, $20,000. Incorporators: Francis T. Germain, Philip J. Dunn and Louis Burgess.

Creuzbauer Non-Exhaust Motor Co., New York City. Capital, $20,000. Incorporators: W. Harry Sefton, William H. Price and Edgar F. Woodward.

Republic Motor Co. of New York, Inc., New York City. To manufacture motors, engines, etc. Capital, $600. Incorporators: Frank H. Twyeffort, Stephan C. Fiero and Ernest J. Ellenwood.

Resilient Punctureless Tire Co., New York City. Capital, $200,000. Incorporators: Seth H. Sheldon, Flossie H. McCready and Leroy McCready.

Brenner Hardt Co., Schenectady, N. Y. To deal in motor vehicles. Capital, $3,000. Incorporators: Adam E. Brenner, Louis Hardt and Amelia Hardt.

Elsner-Lenk Co., Boston, Mass. To manufacture and deal in motor vehicles, etc. Capital, $50,000. Incorporators: Harry Elsner, Oscar C. Lenk and Albert F. Lenk.

Liberty Rubber Co., Jersey City, N. J. To manufacture tires and other rubber goods. Capital, $50,000. Incorporators: B. S. Mantz, L. H. Gunther and J. R. Turner.

Harvard Garage Co., Boston, Mass. Capital, $5,000. Incorporators: E. F. Blake, John B. Lynch and W. E. Collins.

The Worcester Spring Co., Worcester, Mass. Capital, $25,000. To manufacture springs, etc. Incoporators: Chas. B. S. Jackson, G. A. McKenzie and C. E. Sampson.

A. S. Lee Co., Providence, R. I. Capital, $5,000. Motor car business. Incorporators: Daniel J. Healy, H. Ladd Walford and G. Otis Washburn.

Whitesboro Motor Car & Garage Co., Utica, N. Y. Capital, $1,000. Incorporators: J. Webster Rogerse, Mabelle G. Maisan and Adrain S. Maisan.

V-C Motor Truck Co., Kittery, Me. Capital, $100,000 Incorporators: Horace Mitchell and C. E. Smothers.

Baxter Side Car Co., Boston, Mass. To deal in motor vehicles. Capital $20,000. Incorporators: William P. Everts, John R. Lazenby and Edward T. Roche.

Auburn Wheel & Mfg. Co., Auburn, R. I. To manufacture wheels and other parts, etc. Capital $60,000. Incorporators: George Wilkinson, Fred Edgeworth and Bernard T. Egan.

Esco Sales Co., Niagara Falls, N. Y. To manufacture and deal in devices for motor vehicles, machinery, etc. Capital $10,000. Incorporators: Joseph Dovesmith, Spencer R. Parker and Chris. Gombert.

Mohawk Tire Co., Syracuse, N. Y. Motor vehicle tires. Capital $6,000. Incorporators: Henry J. Moses, Winifred G. Rice and Clarence B. Rice.

Henry Engineering Co., New York City. To design and manufacture parts for motors, etc. Capital $20,000. Incorporators: George L. Henry, Harry W. Badenhausen and Myron F. Hill.

Knickerbocker Commercial Vehicle Co., New York City. To manufacture commercial vehicles, etc. Capital $330,000. Incorporators: E. A. Dillenbeck, Jr., J. B. Williams and E. A. Smith.

Penn Unit Mfg. Co., Allentown, Pa. To manufacture commercial cars. Capital, $500,000. Incorporators: S. Bruce Sommervell and others.

Stewart Motor Corporation, Buffalo, N. Y To manufacture motor vehicles. Capital, $350,000. Incorporators: Charles J. Bork, Bernhard L. Fisher and William F. Strasmer.

Newark Auto Truck Mfg. Co., Newark, N. J. To manufacture commercial vehicles. Capital, $500,000. Incorporators: L. W. Babbage, R. H. Poole and J. T. Walsh.

Amplex Motor Car Co., Wilmington, Del. To manufacture motor vehicles. Capital, $1,000,000. Incorporators: W. J. Maloney, N. P. Coffin and E. E. McWhinsy.

Haxolene Lubricating Co., Inc., New York City. To manufacture lubricants fur motor vehicles, etc. Capital $6,250. Incorporators. Fred Lesser, Herman Ehrenthal and Herman Bloch.

Bearson Reciprotary Motor Company, New York City. Capital, $100,000. Incorporators: Charles O. Pearson, Charles L. Herrington and James A. McCarren.

Gas Engine Self-Starting Company, New York City. Capital, $1,000. Incorporators: George M. Auten, Harry C. Farnum and Lemuel C. Altemus.

Realito Tire Company, New York City. To manufacture tires, etc. Capital, $100,000. Incorporators: Edgar T. Wallace, T. S. Williamson and L. H. Starkey.

Parker Garage Company, New York City. Capital, $3,000. Incorporators: Charles T. Green, Edwin B. Griffin and Ernest M. Morrison.

Gotham Sporting Goods Company, New York City. To deal in automobile supplies, etc. Capital, $10,000. Incorporators: Benjamin Goodman, Henry Ephraim and Ben Stacy.

Veitch Motor Manufacturing Company, New York City. To manufacture motor trucks, etc. Capital, $200,000. Incorporators: James S. Harris, Percival J. McIntosh and Charles H. Toy.

Northern Motor Car Company, Albany, N. Y. Capital, $25,000. Incorporators: R. Dudley Cannon, Arthur P. James and J. Somers McClellan.

Robert Stock Auto Spring Whel Company, New York City. Capital, $300,000. Incorporators: Robert Stock, Augusta M. Stock and Joseph F. Bokelmann.

American Carburetion Company, New York City. To manufacture carburetors and parts, etc. Capital, $5,000. Incorporators: William H. Wooley, Albert G. Hubbell and James F. Bisselle.

Maine Motor Car Company, Portland, Me. Capital, $50,000. Incorporators: A. S. Hinds and Ernest E. Brewer.

Blue Ribbon Garage Company, Springfield, Mass. Capital, $2,000. Incorporators: Harry Bland, Albert Karp and John G. Goltesman.

Eckberg & Place Garage Company, Fall River, Mass. Capital, $7,000. Incorporators: Victor J. Eckberg, Ernest Place and Robert Place.

Lansden Electric Vehicle Company, Boston, Mass. Capital, $5,000. Incorporators: Albert B. Freeman, Gardner Freeman and William H. Britton.

Hubmark Rubber Company, Boston, Mass. To manufacture rubber goods, tires, etc. Capital, $25,000. Incorporators: George H. Mayo, O. W. Smith and W. H. Mayo.

Smith Bros. Garage, Inc., Melrose, Mass. Capital, $1,000. Incorporators: Rufus W. Smith, Rufus W. Smith, Jr., and L. A. Smith.

Everitt Motor Car Company, Wilmington, Del. Capital, $3,000,000. Incorporators: Byron F. Everitt, Paul Smith and Harry W. Davis.

Manufacturers' Service Company, New York City. To manufacture engines and other machinery. Capital, $10,000. Incorporators: Walter J. Minehan, Norbert W. Huntington, Daniel E. Meegan and N. Barton Perry.

Dennis Motor Company, Toledo, Ohio. To manufacture motor cars. Capital, $25,000. Incorporators: C. H. Dennis, C. W. Close, Allen E. Reid and R. S. Woodrow.

Merchants' Motor Service Corporation, Philadelphia, Pa. To construct, lease and hire commercial vehicles. Capital, $100,000 Incorporators: George B. Teaz, George W. O'Day and Nathan W. Buzby.

Pitt Motor Truck Company, Pittsburgh, Pa. To manufacture commercial vehicles Capital, $200,000. Incorporators: J. E. Douglas, W. S. Phillips, F. O. Brandt and J. E. McCalmont.

Hassett & Rogers, Inc., Amesbury, N. Y. Capital, $18,000. Incorporators: J. H. Hassett, C. H. Prescott and G. E. Collins.

Michigan Motor Company, Boston, Mass. Motor car business. Capital, $50,000. Incorporators: W. E. Burke and L. Furry.

Zillo Sales Company, Chicago. To manufacture motor vehicles and accessories. Capital, $30,000. Incorporators: J. O. Barker, F. A. Alexander and F. E. Alexander, Jr.

Randolph Motor Truck Company, Dover, Del. To manufacture trucks. Capital, $100,000. Incorporator: I. B. Lipson.

Smart Auto & Manufacturing Company, Indianapolis, Ind. To manufacture motor cars and parts. Capital, $50,000. Incorporators: O. S. Schrader, D. W. Reed and I. H. Shelton.

Commercial Motors Company, Louisville, Ky. To deal in and rent motor cars. Capital, $10,000. Incorporators: H. B. Fitch, R. J. Hurt and R. E. Scharf.

Parker Garage Company, New York City. Capital, $3,000. Incorporators: C. T. Green, E. B. Griffin and E. M. Morrison.

Service Recorder Company of New York. To manufacture time recorders, speedometers, etc. Capital, $10,000. Incorporators: H. P. Seymour, F. Seymour and B. N. Levy.

Moloney Electric Company, New York City. To manufacture and deal in electric supplies. Capital, $700,000. Incorporators: I. J. Wiel, E. Blumenthal and J. H. Muller.

Diamond Motor Car Company, New York City. To deal in motor cars. Capital, $10,000. Incorporators: C. W. Jaycox and F. Davis.

Presto Inter-Rim Company, Portland, Me. To deal in motor cars. Capital, $200,000. Incorporators: M. A. Thurston and H. P. Sweetser.

Pierce-Arrow California Sales Company, Buffalo, N. Y. Motor car business. Incorporators: Walter J. Minehan, Herbert W. Huntington and Lester F. Gilbart.

Ulmer Park Machine Works, Inc., Brooklyn, N. Y. General machine shop and auto repair works. Capital, $5,000. Incorporators: Carl W. Lawson, Frederick W. Prelwitz and Alfred Johnson.

Rowalko Garage Company, of Herkimer, N. Y. Capital, $4,000. Incorporators: William E. Rouse, Jr., William J. Walsed and Gersham Smith.

Crescent Garage Company, Ogdensburg, N. Y. Capital, $6,000. Incorporators: John O. Spear, Charles W. Weed and William Golden.

Bergen Garage, Inc., Huntington, N. Y Capital, $5,000. Incorporators: A. Schenck Bergen, Howard F. Doughty and John H Doughty.

Kipp Auto Company, New York City. To manufacture motors. Capital, $600. Incorporators: Frank W. Kipp, Amanda J. Kipp and Herman Neuerantz.

Remson Automobile Company, Brooklyn, N. Y. To manufacture motor cars. Capital, $15,000. Incorporators: Andrew F. Wilson, William H. Kowenhorn and Albert J. Atchison, Jr.

Boulevard Garage Company, Albany, N. Y. To manufacture motor cars. Capital, $50,000. Incorporators: Morris L. Ryder, Samuel W. Whitney and Horace A. Rayno.

Beckwith Trucking Company, Penn Yan, N. Y. To deal in motor cars and auto supplies. Capital, $10,000. Incorporators: H. Allen Wagner, Jay Beckwith and Grace E. Beckwith.

East New York Motor Cab Company, Brooklyn, N. Y. Capital, $5,000. Incorporators: Jacob Rauch, Frances Rauch and Dan Barnet.

Mercedes Selling Branch Company of America, New York City. Motor car business. Capital, $5,000. Incorporators: Jacques L. Woldenberg, Edmond R. Lyon and Jacob Kooperstein.

Charles B. Shanks, a pioneer in the motor car industry, has joined the forces of the Kelly Motor Truck Co. and will have charge of the western territory. A branch house will be opened in San Francisco, covering California, Nevada, Oregon, Washington, Utah, Arizona, New Mexico, Idaho, Montana and the Hawaiian Islands. The Kelly company has recently opened its factory branch, salesroom and service building in Kansas City, Mo., with Lee Seyster in charge.

W. P. Abbey has resigned from the Gramm Motor Truck Co., of Lima, O., and has taken the position of sales manager with the Bowling Green Motor Car Co., succeeding C. M. Rogers.

R. Harry Croninger has been appointed manager of the San Francisco Speedwell motor agency of the Speedwell Motor Car Co., of Dayton, O. A new building is now under construction for this company.

The Adams Bros. Co., Findlay, O., has opened offices at 68 Broad street to look after its foreign business.

A new branch has been opened by the Kelly Truck Co. in Indianapolis, Ind.

An agency has been opened by the Firestone Tire Company in Montreal, Can.

A new salesroom is about to be opened in Chicago by the Rayfield Carburetor Co.

The White Co., Cleveland, O., is issuing a catalogue on the White heavy service dump trucks.

The Street Cleaning commissioner of New York City, Mr. Edwards, intends to use motor trucks in the disposal of garbage.

H. S. Smith has been appointed manager of the Studebaker Corporation branch at Detroit, Mich., succeeding A. Burwell, Jr.

The city council of Ironton, O., has appropriated $10,000 for the purchase of motor-propelled fire apparatus for the fire department.

The Timken-Detroit Axle Co., Detroit, Mich., has sent out cards describing its roller bearings as "The Roller of the E. A. E. Convention."

It is estimated that $4,200 is saved annually by the use of a 5-ton General Motors truck in the employ of a milling company in New Orleans.

International Gas Engine Co., Cudahy, Wis., has sent out a catalogue entitled "Ingeco Engines" illustrating the different styles of engines manufactured by this firm.

Charles H. Dahlquist of the Lippard-Stewart Motor Car Co., Buffalo, N. Y., has recently been appointed chief engineer. He was formerly assistant chief engineer.

The Lansden Electric Vehicle Co. has been formed in Boston, Mass., with Albert B. Freeman, president; Gardner Freeman, treasurer, and William H. Britton, secretary.

Seagrave Co., of Columbus, O., has been awarded the contract by the fire department of Columbus for the provision of six tractors, four combination hose and chemical wagons and one supply truck.

W. R. Spencer, vice-president and general manager for the Studebaker Corporation, Minneapolis, Minn., has assumed charge of the motor car department, following the resignation of C. R. Newby.

General Motors Co., Detroit, Mich., is sending out another catalogue entitled "Insider," illustrating its different departments, such as private and treasurer's offices, advertising and accounting departments, etc.

New Commercial Vehicle Agencies Established Throughout the Country Recently

Placa.	Cer.	Agent
Memphis	Wilcox	Nolen Bros Auto. Co.
Kansas City	"	Branch
Taylorville, Ill.	Andarson	Ernast Hoovar
Sterling, Ill.	"	L. A. Bittorf
Anderson, Ind.	"	Anderson Auto Co.
Buflington, Ia.	"	Frick Auto Co.
Menominee, Mich.	"	Henes & Keller Co.
Paterson, N. J	"	Deniel Grigga
Akron, O.	"	M. O'Neil
S. Lake City, Uteh.	"	Salt Lake Auto Co.
Cleveland	Idael	H. E. Johnson
Cincinnetl	"	Millar DuBrul & Petars Mfg. Co.
Dayton, O.	"	E. E. Tete
Lykens, Pa.	"	H. E. Buffington
Brooklyn	"	J. Brebend & Son
Buffalo	"	E. E. Grimmail
Troy, N. Y.	Decetur Hoos'r.	Geo. H. Snyder
Auburn, N. Y.	"	E. J. Nolen
Ft. Wayna, Ind.	"	Frenk A. Drage
Salem, Mese.	"	J. S. Nalaon & Son
Danbury, Conn.	"	Fillow Auto Co.
Lafeyatte, Ind.	"	D. N. Fostar & Co.
Randolph, Vt.	"	Harold F. Tetro
Chempeign, Ill.	Avery	T. H. Creig
Columbus, Ind.	"	Kirneey Gerege
South Chicago, Ill.	Mercury	LeRoy P. Brown
Graenfield, Maes.	"	Cutler Brothera
Milwaukee, Wia.	"	J. W. Gerbutt
Hemmond, Ind.	"	A. O. Merrill
Recine.. Wis.	"	Sigwerd Nelson
Bay City, Mich.	"	N. H. Nicklass
Boston, Mess.	"	F. L. Prett
Gloucester, Maes.	"	Percy W. Wheeler
Pittsburg, Pa.	Faderal	Union Motor Car Co.
Syracusa, N. Y.	"	Jamas Auto Co.
Columbus, S. C.	"	Gibbes Mechinery Co.
Atlanta, Ga.	"	Cola Motor Co.
Washington, D. C.	G M C	Chepman & Moss
Bengor, Ma.	"	Bengor Motor Co.
Eaton Rep's, Mich.	"	A. M. Smith & Co.
St. Louis, Mo.	"	Ganeral Motors Truck Co.
Berlin, N. H.	"	City Garege Co.
Manchastar, N. H.	"	Horace L. Putnay
Catskill, N. Y.	"	Amos Post
Burlington, Vt.	"	Van Nass Gerege
Aurora, Ill.	Dert	J. M. Fray
Frederick, Md.	"	Fradarick City Gerage
Radfiald, Ia.	"	Nelson Bros.
San Diego, Cel.	"	H. W. Stona
Lima, O.	"	C. E. Miller
Washington, D. C.	"	Meryland Ava. Motor Cer Co.
Danver, Colo.	"	Dert Dalivery Cer Co.
Winnipeg, Cen.	"	Rumley Products Co.
Deyton, O.	"	Hosier-Ovarland Sales Co.
Rochaster, N. Y.	"	John Grapa
Wilkae-Berre, Pe.	"	Chas. D. Lagrend
Joliet, Ill.	"	L. Stern & Son
Canterville, O.	"	F. R. Potter
Slatington, Pa.	"	C. P. Snyoer
Welsport, Pe.	"	A. F. Snyder
Cannon Falls, Minn.	"	G. O. Millar Co.
Harrisburg, Pe.	"	Ensminger's Garege
Leetsdele, Pe.	"	Gao. B. Wright
Redlende, Cal.	"	W. H. Pattibone
Portlend, Ma.	"	Maine Powar Wagon Co.
San Francisco, Cel,	Dayton	Pan-Amarican Motors Co.
Philadelphia, Pa.	"	Marchants Motor Serv. Corp.
San Antonio, Tex.	"	Kuntz-Albaugh Lumbar Co.
Waterloo, Ie.	"	Watarloo Auto & Supply Co.
Cincinnati, O.	"	Jungleas Auto Co.
Melbourne, Aust'l'e	Kelly	Ryan Lewis Co.
Place.	**Car.**	**Agent**
Jecksonville, Fle.	"	Southarn Steel & Iron Wks.
Quebec, Cen.	"	P. T. Lagere Co., Ltd.
Montreel, Cen.	"	Lagere-Gadbois Automobile Co., Ltd.
Delles, Tex.	"	Delles Transfer Co.
Great Fells, Mont.	"	Northwestern Automobile & Enginearing Co.
St. John, N. B. Cen.	"	Paga Wire Fence Co.
Victoria, Can.	"	Wm. Mable
Washington, D. C.	"	Peerlass Motor Trensfer Co.
Ottawa, Cen.	"	Ottawa Tranefer & Taxicab Co.
Chicego, Ill.	Argo	Matzger Herrington Co.
Springfield, Ill.	"	Glen D. Smith
Rockford, Ill.	"	F. L. Miller Auto Co.
Columbue, O.	"	F. E. Avery Motor Cer Co.
Coloredo Spgs., Col.	"	C. S. Emmart
Menitobe, Cen.	"	Jos. Mew & Co.
Winnipeg, Can.	"	Alberte & Seskatchewen
Los Angeles, Cal.	Adems	J. A. Meaks
Oaklend, Cal.	"	Diehl & Teichner
Duluth, Minn.	"	Electric Service & Repair Co.
New York City.	"	Adems Bros. Co.
St. Joseph, Mich.	Poss	J. W. Isbell
Ft. Wayna, Ind.	"	F. H. Drage
Sioux City, Ie.	"	Intar-Stata Auto & Sup. Co.
Lafayetta, Ind.	"	G. S. Patterson
Lincoln, Neb.	"	Capital Cartarcer Co.
Hartford, Conn.	Modern	E. W. Clerk
Lykens, Pe.	"	H. E. Buffington
Providence, R. I.	"	Hitchcock-Banks Motor Cer Co.
New Hevan, Conn.	"	Holcomb Company
Naw Barlin, N. Y	"	T. H. Dekin & Son
Peoria, Ill.	"	E. M. Luce
Wheeling, W. Ve.	"	Eilg Carriage Co.
Ottawa, Ont.	"	Wylie, Limited
Columbue, O.	Blair	Adamson Automobile Co.
Hemilton, O.	"	J. F. & H. E. Bender
Akron, O.	"	M. C. Burge
Danver, Colo.	"	Sheffar Auto Supply Co.
Waukagan, Ill.	"	White & Prosser
Providenca, R. I.	Autocer	Autocar Salas & Service Co.
San Juan, P. R.	"	J. M. Hughart
San Francieco, Cal.	"	W. C. Morris
Los Angeles, Cal.	"	M. S. Bulkley
Buffelo, N. Y.	"	E. T. Perkes
Toronto, Cen.	"	Dominion Auto Co.
Wilmington, Del.	"	Autocer Seles & Servica Co.
Baltimore, Md.	"	Mt. Vernon Motor Car Co.
Washington, D. C.	"	Wm. Morris
Louisvilla, Ky.	"	Commarcial Motor Cer
Scranton, Pe.	"	Standerd Motor Cer Co.
Minneapolis, Minn	"	Nicollet Auto Co.
Chicago, Ill.	"	Commarciel Cer Selas & Service Co.
St. Louis, Mo.	"	Capen Motor Cer Co.
Atlanta, Ge.	"	Doobs-LaHette Co.
Werren, Pe.	Alco	Ramp & Orr
S. Lake City, Uteh.	"	Cheesmen Auto Co.
Trenton, N. J.	"	John L. Brock
Oaklend, Cal.	Frenklin	Petar Callender
Sacremento, Cel.	"	Stanlay Bias
Konkakee, Ill.	"	Lincoln Garaga & Repelr Co.
Rushvilla, Ind.	"	Sanitary House Cleening Co.
Bamberg, S. C.	"	Decania Dowling
Youngstown, O.	More	J. Relph Seidnar
Sen Frencisco, Cal.	Lippard-Stawer	Hunter Automombile Co.
Breddock, Pe.	"	H. S. Leighton Co.
Youngstown, O.	Republic Rubber	B. C. Swinahert
St. Louis, Mo.*	Firestone Tires.	Bronch

*Removal.

Trucks in Municipal Markets

A Summary of the Most Recent Activities During the Last Few Weeks in the Municipal Markets With Regard to Motor Vehicles

MARKET conditions have improved during the last month so far as the use of motor vehicles in the fire department service, in ambulance and in police services is concerned. The country is today on the crest of the wave in so far as motorizing fire department is concerned. The tide in this direction began with the large cities but it has grown so rapidly that now it has taken hold of the smaller cities with populations not over 30,000. One of the tendencies of the last few months has been the avidity with which the old makers of fire department apparatus have taken up the motor end. There is today, because of this, a strong sentiment in favor of utilizing as much as possible the old horse-drawn apparatus by the use of a motor tractor. This is economy, as it utilizes the old apparatus and gives a vastly improved service.

The activity among the various fire and police departments and also in the inner circles of city councils continues. For every one concern which publicly invites bids on motor vehicles there is a score that is quietly investigating the situation and studying the various products offered. The following market bids and reports on sales, representing activities of the last few weeks, gives a small conception of the general activity.

The Winnipeg electric street railway has purchased another motor truck. The latest addition is a 3-ton Packard.

The police department of the City of Winnipeg is still willing to receive proposals from the manufacturers for the supply of a light electric patrol wagon, suitable for bringing in one prisoner.

The City of Winnipeg now has four motor hose wagons.

The Minneapolis Board of Fire Underwriters will take up consideration of the question of buying a motor squad wagon this fall.

The fire commission of St. Paul is to take up the subject of motorizing the department. Commissioner Reuben Warner favors entire motorization. The board is to try out a motor fire engine.

Providence, R. I., is considering the purchase of two motor-driven patrol wagons.

Nantucket, R. I., recently purchased a motor chemical and hose wagon.

Common Council of Milwaukee, Wis., has recommended the purchase of a combination hose and chemical motor truck.

Little Rock, Ark., has purchased two new pieces of motor-driven fire apparatus.

Grand Rapids, Mich., is open to bids for a number of pieces of motor-driven fire apparatus.

San Antonio, Tex., is contemplating the purchase of a combination police patrol and ambulance.

Butte, Mont., is considering the purchase of motor fire apparatus.

Council Bluffs, Ia., anticipates the installation of motor-driven fire apparatus.

The city council, Raleigh, N. C., has purchased two combination chemical engines and hose wagons.

The fire committee, Athens, Ala., is examining motor-driven fire apparatus with the intention of purchasing the same.

Little Rock, Ark., has purchased motor-driven fire apparatus.

Tampa, Fla., is considering the purchase of two combination chemical and hose wagons to be added to its present fire department's equipment.

Gaffney, S. C., is considering the purchase of a motor fire truck.

The council committee of Reading, Pa., anticipates installing motor-driven fire apparatus soon.

Canton, O., is asking for bids on seven motor fire trucks and one supply wagon.

Alhambra, Cal., is considering the purchase of a motor-driven fire engine.

Echo Park, Cal., anticipates installing motor-driven fire apparatus.

Freeport, Ill., is considering the purchase of an automobile patrol.

Springfield, Ill., is considering the purchase of a motor patrol wagon.

Five fire trucks have been purchased, together with a chemical and hose truck by the fire department of Gary, Ind.

Sioux City, Ia., has received its new combination pumping engine, chemical and hose wagon.

Hingham, Mass., is considering the purchase of motor-driven fire apparatus.

Steps are being taken to equip the fire department of Ann Arbor, Mich., with motor fire apparatus.

The city council of Tekamah, Nebr., has voted to add a chemical fire engine to its fire-fighting equipment.

Delaware, O., is considering the purchase of motor fire apparatus.

Mt. Carmel, Pa., will soon be in possession of its motor fire truck ordered by the American Hose and Chemical Company.

Beaver, Pa., is considering the purchase of motor fire apparatus.

It is expected that in a short time the George Clay Fire Company of Norristown, Pa., will have motor-driven fire apparatus.

West Chester, Pa., is anticipating the purchase of motor driven fire apparatus.

Jackson, Tenn., expects to install motor driven fire apparatus.

The Board of City Commissioners of Memphis, Tenn., is opened to bids for an automobile combination pumping engine and hose wagon, also a police patrol.

Abilene, Tex., is considering the purchase of motor fire apparatus to cost $10,000.

Yoakum, Tex., has received its $7,000 motor driven fire engine.

The fire department committee, Milwaukee, Wis., has recommended a resolution providing for the purchase of two combination hose and chemical motor trucks.

San Diego, Cal., is considering the purchase of motor-driven fire apparatus.

The fire department of Windsor, Ont., will soon have a motor-driven engine added to its equipment.

Rockford, Ill., will soon receive what is claimed to be the largest consignment of motor fire engines ever placed in one factory.

Evansville, Ind., has purchased a combination motor chemical and hose wagon.

Coffeyville, Kan., is considering the purchase of motor fire apparatus.

Lansing, Mich., is anticipating the purchase of motor fire apparatus.

Utica, N. Y., has purchased a motor fire truck.

An appropriation of $5,000 has been made in Easton, Pa., for a combination chemical engine and hose wagon.

Mansfield, O., anticipates installing motor fire apparatus.

Superior, Wis., is considering the purchase of motor driven fire apparatus.

The Maker's Viewpoint

ONE of the strangest facts in modern commercialism and especially in the motor truck industry is that many manufacturers do not realize and will not realize that the sales end is just as important a branch of the business as the manufacturing part.

What is the good of making a first-class article when you do not give yourself as well as the article a fair show?

If an article of merit is manufactured, no matter what it is, it behooves the manufacturer to give the selling end the opportunity to make a noise and to do what it possibly can to keep the factory going, day in and day out.

Also, big noise as an advertisement is an investment bound to pay heavy dividends if judiciously and consistently used. There is scarcely any other branch of up-to-date merchandising where the proper kind of advertising will bring so quick and so large returns.

The sales manager, the advertising manager and the factory superintendent ought to work in perfect harmony, they should have daily meetings where everything appertaining to the product and its selling points are discussed.

An efficient sales organization is only possible when in all departments of the concern the spirit of cooperation and of working for the common weal predominates. In small and medium-sized concerns the sales and advertising department should be in the hands of one man. The advertising policy is, after all is said and done, the selling policy, and its trend should permeate every phase of the outside work of the company.

The selling talks of the salesmen, the salient points made for the truck in the follow-up matter, should harmonize fully with the literature sent out, and the very advertisements should show the same thought waves. Only then a harmonious whole is presented, and against the onslaught of competitors an almost invulnerable front is created. Everything dovetails, and the prospect feels the strength of all the arguments—printed, written, oral—they sink into his brain and the order is given.

There are other points worthy of comment and discussion, but the one fact stands out beyond all others that many motor truck manufacturers are woefully weak in their sales organization and that they only have themselves to blame if at the end of the year the balance on the right side of the ledger is puny.

A. MEYER, Bessemer Motor Truck Co.

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CONTENTS

Truck Operation in the Twin Cities 5
Making Truck Sales 14
The Trend of the Times in Truck Work—Part VI 16
Law of Good Tackle 19
New English Tractors 20
The Demonstration 23
The Editor's Viewpoint 24
Discuss Timely Motor Truck Problems 26
Motor Sizes and Ratios for Trucks 28
News of the Month re Motor Trucks 32
Trade Conditions During June and July 34
Cross-Continent Trip 36
Gasoline Truck Field 38
Montreal Fire Trucks 39
Motor Vehicles for Florists' Deliveries 40
Municipal Service Extensions 44
The Guarantee of Service for Solid Tires 46
Modern Construction of Rear Axle and Spring 50
Commercial Car Questions Discussed 54
Trucks in Coal Field 56
Vulcan Trucks and P. & M. Electric 58
The Agricultural Motor Trials at Winnipeg 60
Trade and Personal Items 64
Commercial Vehicle Incorporations 64
Truck Market Possibilities for American Makers 66
New Commercial Vehicle Agencies 67
Horsepower and Gear Ratio in Trucks 68

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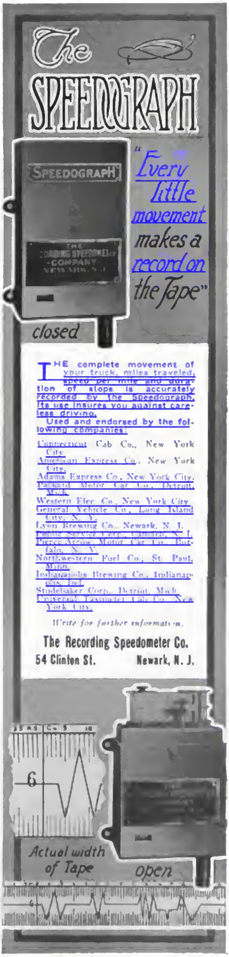
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"Every little movement makes a record on the Tape"
SPEEDOGRAPH
THE CORDING SPEEDOMETER COMPANY
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Actual width of Tape
open

THE complete movement of your truck, miles traveled, speed per mile and duration of stops is accurately recorded by the Speedograph. Its use insures you against careless driving.

Used and endorsed by the following companies:

Connecticut Cab Co., New York City.
American Express Co., New York City.
Adams Express Co., New York City.
Packard Motor Car Co., Detroit, Mich.
Western Elec. Co., New York City.
General Vehicle Co., Long Island City, N. Y.
Lyon Brewing Co., Newark, N. J.
Public Service Corp., Camden, N. J.
Pierce-Arrow Motor Car Co., Buffalo, N. Y.
Northwestern Fuel Co., St. Paul, Minn.
Indianapolis Brewing Co., Indianapolis, Ind.
Studebaker Corp., Detroit, Mich.
Universal Taximeter Cab Co., New York City.

Write for further information.

The Recording Speedometer Co.
54 Clinton St. Newark, N. J.

The Autocar

John Wanamaker Now Owns 100 of Our Delivery Cars

Three years ago we sold John Wanamaker his first *Autocar*. Last month's order for *twenty Autocars* is his *seventh repeat order* to take care of his increased business.

The *Autocar* is endorsed by 675 of the country's leading business concerns, owning from one to one hundred *Autocars* each.

Write for List of users and Catalog Series No. 4D

THE AUTOCAR COMPANY **Factory, Ardmore, Pa.**
(ESTABLISHED 1897)

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642 Beacon Street

ST. LOUIS,
4739 McPherson Ave.

ATLANTA,
56 Magnolia Street

TORONTO
Bay & Temperance Sts.

CHICAGO,
918 S. Michigan Ave.

SAN FRANCISCO,
545 Golden Gate Ave

LOS ANGELES,
Main & Washington Sts.

Continuous Efficiency Guaranteed

The
COMMERCIAL VEHICLE

Vol. VII August, 1912 No. 8

Truck Operation in the Twin Cities Systems and Services at St. Paul

A Comprehensive Survey of Delivery Conditions in Minneapolis and St. Paul and the Comparative Operation of Motor Trucks in Different Kinds of Delivery Service

IN Minneapolis there are 312 motor trucks in use and 8000 draft horses in delivery work; in St. Paul there are 146 motor trucks and 6011 horses. Minneapolis is progressive, adopting trucks because they are the best modern means of delivery; St. Paul is conservative and requires actual demonstration of results before purchasing.

ST. PAUL and Minneapolis, forming practically a single community with two distinct business centers, offer peculiar opportunities for the study of motor truck use under different services, since each city, though directly adjacent to the other, presents entirely different problems from its neighbor and surrounds a motor truck with an entirely new set of conditions.

The average two-horse load in St. Paul is but two tons, owing to long and steep hills; in Minneapolis the average load is over three tons.

Sixty per cent. of St. Paul's motor freight vehicles are in the one-ton class, whereas the majority of Minneapolis' trucks are three-tonners—53 per cent., to be accurate.

St. Paul machines, being smaller, are pneumatic-tired high-speed vehicles for the most part, making two trips to one of the larger Minneapolis hard-tired vehicles, though carrying less load.

One-ton machines in St. Paul are making a better showing against horse systems than three-tonners in Minneapolis, due largely to the comparative size of horse loads in the two communities.

Minneapolis has 312 motor trucks; St. Paul but 146, but on account of the more frequent trips of the smaller machines a casual observer on the streets of the Twin Cities would venture the opinion that there were more machines in St. Paul.

More motor trucks are used by St. Paul groceries than in any other line, the grocery situation in this city being especially interesting.

One grocery firm in adopting motor trucks for outlying delivery increased the business in this territory by 60 per cent. in 11 months' time, the increase in six months being sufficient to pay for the six machines used. Another firm increased its telephone orders 18 per cent. in four months on adopting its first truck.

A truck operating in suburban work for a St. Paul department store is doing the work of 12 horses. Three motor trucks with this store have displaced 16 horses and eight wagons, and are doing the work of 26 horses.

A packing company, on account of a long steep hill, is making a 3.5-ton truck pay on a 1.5-mile haul.

This article deals with the general "Twin" situation and takes up in detail St. Paul systems and services. A later article will discuss the interurban traffic and motor hauling between the cities and Minneapolis truck systems and use, with a discussion as to the type of vehicle demanded in this field.

Probably no other two cities in America present a more favorable opportunity for the study of comparative operation of motor trucks under different kinds of service than the Twin Cities, Minneapolis and St. Paul.

The two cities, aggregating a population of 500,000 and more, are situated but 10 miles apart so far as business centers go, but directly adjoining in boundaries. The resultant is that of one city with two business centers; Minneapolis built up about the falls of St. Anthony and founded originally on the milling industry and manufactures and St. Paul which has grouped itself about the head of navigation on the Mississippi, one of the world's greatest railroad centers.

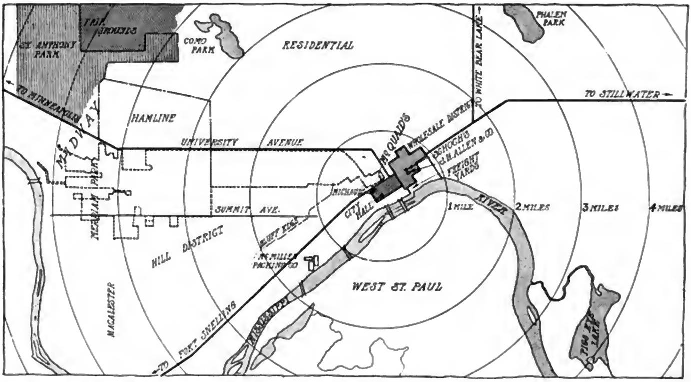


Fig. 1—Map of St. Paul, Showing Business Center in Dark Shaded Portion. The Concentric Circles Are 1 Mile Apart and Indicate the Zones of Motor Delivery. The Dotted Line Shows the Trip of the McQuaid Truck in the Grocery Service

Minneapolis is thus a manufacturing and retail center and a progressive, hustling city, located for the most part on level ground and surrounded by delightful lakes. It is a social center as well, and the lakes, especially Minnetonka, widely known as fashionable summer resorts.

St. Paul is, on the other hand, a greater shipping center, and is known as a wholesale town. The Mississippi River before the times of history, other than geological, discharged its mass of water over the hills which are now the chief geographical feature of the Saintly City, but as the hills wore away from the water's action the falls receded upstream until harnessed permanently at the present site.

St. Paul is thus hilly and Minneapolis flat.

The presence of hills in St. Paul limits the average two-horse load to the neighborhood of two tons, while in Minneapolis, with its flatter surfaces, a three-ton load is common. One must climb long and steep hills to leave the business center. This has a very distinct bearing on the motor truck situation in both cities as will be more fully explained later.

St. Paul streets are narrow, especially in the main retail district, the more noticeable since the greater part of the city's crosstown traffic must pass through this business area. Large business buildings are also few in comparison with Minneapolis, whose streets are wide and well paved. Commodities can be carried across Minneapolis without the necessity of passing through the downtown traffic, bridges being located at points other than the central district, this arrangement permitting roundabout routes to be followed.

The dividing line between the two cities is nearer to the business center of Minneapolis than St. Paul, so that the greater part of the so-called Midway District (a residential and manufacturing area between the cities) is within the limits of St. Paul. Here has grown up a residential district chiefly separated into different sections called Macalester, St. Anthony Park, Merriam Park, Hamline, e.c., as shown in Figs. 1 and 2.

Take a point in this Midway District and with it as center describe a circle of eight miles radius, and you will take in an area within which is accomplished 98 per cent. of Twin City retail delivery. The limit of delivery will be noted by a circle of 20 miles radius from the same point, denoting the limits of summer delivery to the lakes, smaller communities and resorts about these cities. (See Fig. 2.)

While there are 50 lakes within a radius of 25 miles of the Twin Cities each city has its favorite for summer residence, St. Paul choosing White Bear Lake, with its neighboring but smaller Bald Eagle Lake, reached by trolley and located 12 miles from the city limits on the north, while Lake Minnetonka is the summer home of thousands of families mostly from Minneapolis, and located about 29 miles west of that city. This lake, through its peculiar shape, has over 100 miles of shore line though a comparatively small lake. Most of the delivery work to the lake centers at Excelsior, a small town which marks the main port for boat traffic and from which delivery boats of some of the Minneapolis downtown stores deliver to all points. This summer traffic continues from May to September. These months in particular are filled with moving activities, and the delivery of household goods from city to lake and vice versa by the van companies, especially those owning motor trucks, in their period of biggest business.

There are 312 motor trucks in use in Minneapolis and 8000 draft horses in delivery work; 146 motor trucks are operating in St. Paul and 6011 horses are registered for delivery and hauling service. Nevertheless one who is merely a casual observer of the streets of the two cities would venture the opinion that there

were more motor delivery vehicles in St. Paul than in Minneapolis, due to the smaller relative size of St. Paul trucks as compared to Minneapolis trucks, and the fact that they make probably two trips to the sister city's one.

This matter of truck sizes is probably the first item that one notices in comparing these cities, and it was some time before a reason for the condition was found.

As mentioned before, the average horse load in St. Paul is two tons, or a little under, on account of hills; in Minneapolis a two-horse team can draw three tons and a little over in regular service. This being true, in order to carry the standard loads, and to compete with horses on a direct mileage basis, a two-ton truck of certain speed in St. Paul can make the same showing against horse expense as a three-ton machine in Minneapolis. Indeed, the comparison is even greater, for, as is well known, a machine of three-ton capacity is a hard-tired vehicle of limited speed; a one to one and a half ton can use pneumatic tires and work to the speed limit. Hence, in St. Paul with pneumatic tired 1500-pound to 1½-ton delivery vehicles of ample horsepower for hill work, delivery is being done in quantities and mileage and cost, as compared to horse equipment, which is hardly equaled by 3-ton machines in Minneapolis. This is not in any way the fault of anything or anyone, but a result of the topography of the two cities comparatively. **What will do in one does not do in the other.** This is but another proof of the importance of surrounding motor vehicles with proper system and brains to develop the best that is in them rather than blaming a truck if it doesn't make good. In most cases where a machine fails to make a showing the motor truck itself is no more to blame than is a store building to be blamed if a business fails in it. **The equipment is all right; fix up the business!**

The following table shows comparatively the number of motor trucks in use in the Twin Cities, 458 in all, up to June, 1912:

Business.	Minneapolis.	St. Paul.
Van and transfer	38	10
Miscellaneous manufacture	55	24
Groceries	22	30
Liquors and brewing	19	6
Commission	20	6
Lumber	15	2
Meats	16	5
Hardware	11	3
Furniture	9	8
Department stores	9	7
Fruits	10	4
Candy and confectioners	5	0
Dyers	5	1
Laundries	7	3
Deliveries (contract)	5	0
Undertakers	5	1
Decorators	4	2
Creameries	3	4
Bakeries	3	0
Water delivery	3	0
Agricultural implements	5	2
Bus and passenger	3	0
Coffee	2	0
Plumbing and heating	2	4
Flour	2	0
Glass	2	0
Unlisted and miscellaneous	30	17
Coal	0	2
Newspapers	0	3
Total	312	146

A general estimate of truck sizes in Minneapolis and in St. Paul is somewhat as follows, all odd sized trucks being grouped in their nearest column:

	Minneapolis.	St. Paul.
1-ton	74	87
3-ton	167	47
5-ton	70	12

Fifty-three per cent. of Minneapolis motor trucks are of 3-ton capacity, while 60 per cent. of St. Paul machines are of about 1-ton rating, only 32 per cent. being 3-ton trucks.

The comparative scarcity of machines in St. Paul over the sister city may be largely attributed to the mental differences in the population. St. Paul in every public move has the attitude of having to be shown; Minneapolis wants to find out. To sell a machine in St. Paul a merchant must be convinced absolutely; in Minneapolis, taking it for granted that the motor truck is a progressive and coming means of goods delivery, the merchant is willing to work out things for himself. St. Paul is conservative, Minneapolis progressive. The foreign population of St. Paul is largely composed of Germans and Irish, attracted by the railroad and shipping interests originally; Minneapolis is largely Scandinavian, folk attracted originally by agricultural possibilities and manufactures. This all has its bearing on motor truck use. Now that Minneapolis has made good with motor trucks, however, St. Paul is gaining, as during the past year there has been an increase in motor trucks in St. Paul of 100 per cent. and in Minneapolis of about 90 per cent.

Thus is outlined a general and comparative situation. It will be the purpose of this article to take up further

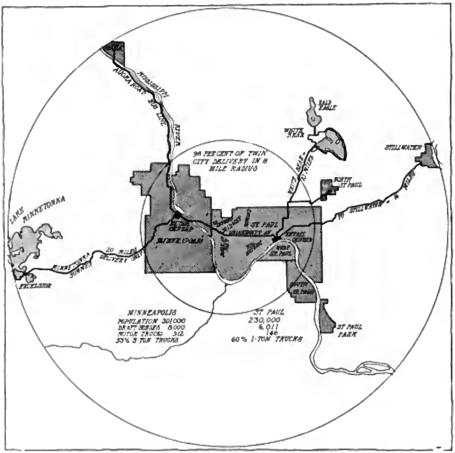


Fig. 2—The Twin Cities of St. Paul and Minneapolis. The Inner Circle Has a Radius of 8 Miles, the Outer Circle a Radius of 20 Miles

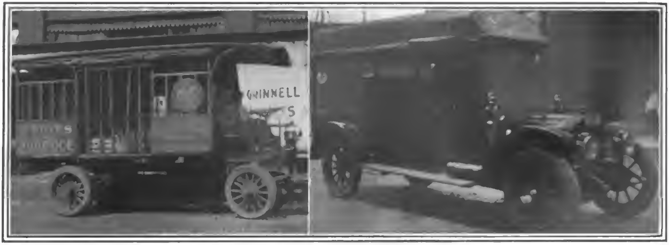


Fig. 3—At the Left Is Typical Minneapolis Truck with an Average Load of 3.25 Tons and on the Right Is the Typical St. Paul Truck with Pneumatic Tires and Intended for a Two-Horse Team Load

the motor truck in St. Paul only, mentioning the sister city but comparatively when necessary. A later story will deal with Minneapolis problems and the lessons of interurban traffic and delivery to the lakes. The study at present will thus be of the right hand half of the smaller circle of the diagram, Fig 2, a semicircle of 8 miles radius in which is accomplished 48 per cent. of Twin City delivery, the urban delivery work of a city of 230,000 souls.

General Situation in St. Paul

St. Paul has increased in population 41 per cent. in the last six years, while its bank clearings total over $500,000,000 a year.

Two hundred thousand carloads of freight are received in St. Paul annually and 159,000 shipped out. In the midway district is located one of the largest freight transfer yards in America.

St. Paul has 803 miles of streets, 49 miles of paved streets and very few poor surfaces.

The majority of St. Paul residents are well to do, living in comfortable modern homes, and there is no slum district in this city. The better residences are west of the civic center, starting with the so-called Hill district, a mile away, and running from that back to Macalester, near the river, and to the parks, further north, as shown on the map, Fig. 1. A large amount of St. Paul retail delivery is within this district—probably 60 per cent., and it is within this territory that the best of service is required. Thus for the purposes of this article we have to deal principally with the hill and park districts, out to and including midway.

In this work, as a glance at the list of St. Paul trucks will show, the delivery of groceries is by far the most important so far as motor vehicles are concerned, for groceries in St. Paul use more motor trucks than any other class of trade. How these trucks are used and why so many are used in this particular branch can best be explained by taking up the downtown grocery situation, and leading on into individual cases.

There are three downtown groceries of considerable size and all vying with one another for the best trade of the city—Michaud Brothers, McQuaid's and Andrew Schoch's. The first two are in what might be called the loop, or main business center of the city, and but two blocks apart. The third named is a mile further from the hill population, and at that much disadvantage on the delivery end, but having at the same time the lower rent of the outside territory, being located practically in the wholesale district of the business section, and on a main thoroughfare.

Having the advantage of lower rent, Schoch goods have had a price reputation at the expense of service, but with the advent of the motor truck came the opportunity for this firm to offer service as well. When once it started with motor delivery the others had to follow, for, since they could make but little if any difference so far as prices went, they must bid for trade with more efficient service. Since the holding of trade with the better sections of the city, and in a measure with all sections, is based on service alone, there is nothing else for it but quick, speedy and efficient motor delivery. What has happened here will undoubtedly happen in other cities within a short period, and the fewer firms there are in direct competition for downtown trade the quicker will be the change. Where one store is big enough to handle the whole field, if it can get it, the rest will have to take hold of every new opportunity for increased service in order to keep their share.

This but hints at the fact that motor trucks may eventually eliminate the corner grocery which is not large enough to own motored equipment and to serve a large territory quickly and efficiently. Big stores with modern equipment are winning out.

Possibly as typical a case as any in St. Paul is the experience of Michaud Brothers, dealers in groceries and meats in the downtown district. Located just at the north edge of the business district, they are handily placed as regards the residential district for quick delivery, having several blocks' advantage over other stores.

Michaud Brothers, by using motor trucks in their delivery work, have made an especially good showing in the park and midway districts, where three 1.5-ton pneumatic-tired motor delivery wagons have taken the place of 12 horses, covering at the same time 25 miles more per day in their work than the horses had been able to do.

This firm has in use six motor trucks, 1.5-ton machines, all of them, and capable of speed. These take

the place in all of 20 horses. Each machine averages three trips per day, delivering from 90 to 95 orders per trip. The daily average for each motor vehicle is about 300 orders.

It has been found most economical to have a boy on each wagon with the driver to help in delivering and sorting on the way, so that the machine does not have to stand idle while the driver is searching for a package.

Tires last from five to six months on these machines, all living up to the 5000-mile guarantee, and some running over. While more tire expense is to be experienced than on hard-tired vehicles, yet the real saving is evident when the repair bills for the rest of the car come in. The first car put into service has been running 11.5 months, and to date has had no repair work but the cleaning of one spark plug. Of course, this is exceptional and, it is claimed, largely due to a careful driver. The other machines, however, show a repair expense ridiculously low.

The motor delivery service since it started has resulted in an increase of business in the park districts and midway of over 60 per cent. This increased business, it was stated, amounted to enough to pay for the motor vehicles at the end of six months.

Michaud Brothers originally used 43 horses in their delivery work; they now have 23 for local delivery. The motor trucks make no deliveries within a three-mile radius.

Motor delivery has also meant a real saving for this firm. The original cost per package for delivery by horses was 4.5 cents. With motor vehicles this has been cut to 2.5 cents per delivery. This includes every cost of the truck. Garaging is done under contract at $20 per month per car.

Trucks are averaging 40 miles per day, while the machine on lake delivery makes 55 miles regularly every day, delivering to White Bear Lake, over a macadam road, to Bald Eagle Lake, and surrounding districts. During the summer months thousands of people move to these lakes, there being some ten separate towns on the shores of White Bear alone, which have their hundreds of inhabitants in summer and are entirely deserted in winter, even watchmen then being conspicuous by their absence. This necessitates the moving in at the end of every season of the greater part of the house furnishings and goods and the moving out again in the spring, a job handled by local van and express companies with horse vans, one firm using a motor van, however, for this purpose. But this is diverging from the grocery trade.

In this White Bear trip Michaud's machine has accomplished in one trip the delivering and taking of some 125 orders, besides the 55-mile run. The chief delays in delivery are on C. O. D. orders, average stop being two minutes. Ordinarily 75 to 100 orders and deliveries are handled.

Grocery Work in the Twin Cities

One interesting phase of Twin City grocery work is that practically all of these firms use folding boxes for their deliveries, as shown in the photographs of the Michaud trucks, Fig. 4 and Fig. 7.

These boxes are made up of stout three-ply 0.5-inch wood wired for extra strength. The bottom and corners are hinged. When empty the bottom is pushed up against one side and the corners then pivot, allowing the whole box to lie down flat. When opened up the wiring of the wood projects to form a dowel-pin near each corner so that boxes may be piled in stacks with these dowels fitting into slots in the box bottoms, all as one unit and with no danger of slippage. This is shown on the loaded machine. Each box is of one-bushel capacity in order to aid measuring. With this method the loading is greatly facilitated and no space in the body lost. Boxes are put on according to the route so that there is a minimum of delay in delivery. This saves much of the running time of the machine.

Michaud and Kelly, another downtown grocery firm of St. Paul, has been using a motor truck of local make for a year. During the first four months of use of this machine the telephone orders for groceries from the hill district increased by 18 per cent.

The Schoch Grocery Company took advantage of the failure of a local truck building concern to buy up nine machines at a reduced rate. These machines are in daily operation in their grocery delivery, but no figures are available. They are a complete success and have resulted in greatly increased business.

McQuaid's, one of the largest of St. Paul's downtown grocery firms, is now using six motor trucks of 1 to 1.5-ton capacity, all on pneumatic tires.

This firm is handicapped with lack of room for loading. All of the loading is done from the sidewalk and

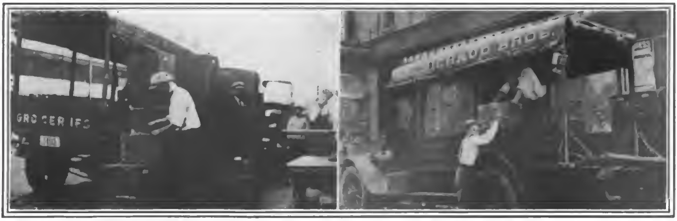


Fig. 4—The Left Illustration Shows Loading at Michaud Bros. Grocery and Illustrates the St. Paul Type of Truck. The Use of Special Boxes Can Be Noted. The Illustration At the Right Shows the Ease with Which These Boxes Can Be Handled

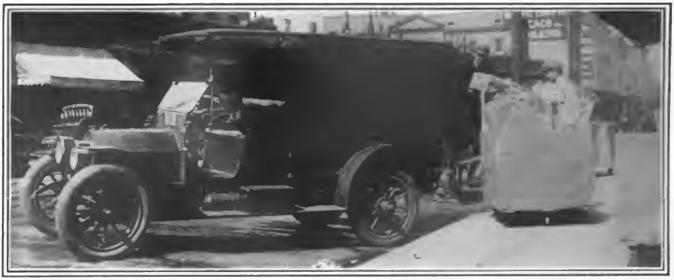


Fig. 5—A Department Store Truck in the Twin Cities Loading for Late Delivery Work. The Type of Truck is Shown and Also the Loading System Consisting of the Wheeled Tray on the Sidewalk

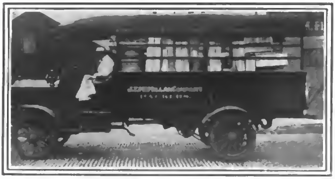


Fig. 6—Truck Used by the McMillan Packing Co. Operating Successfully on a .5-Mile Haul. This is Possible by a Steep Hill on the Route Which Forces Horse Vehicles to Take 1-Mile Detour

all of the south side of the street is blocked by their wagons and trucks. Passing street cars must slow down, as there is but a space of a foot or so between the tracks and the horses. When motor trucks are adopted entirely this will be helped considerably. A 24-foot alley is of little use, for it is so blocked with other traffic as to be almost impassable.

Disadvantage of Loading Methods

This lack of room has a two-fold disadvantage; it not only blocks both the street and sidewalk, but it so impedes the loading process that the truck for the 55-mile White Bear Lake trip stood three hours before a single box was put on it. All wagons and trucks stand in line a half-block long, which means that every box for the farthest truck must be carried 100 feet. No small hand trucks were used in the loading checked up, although there was one standing idle blocking the sidewalk.

In loading the White Bear truck the boxes for this route were first piled up on the sidewalk next the wall until the truck was backed into position. When room was left and it backed in they were rehandled and sorted on the sidewalk, forcing pedestrians to use the street; this operation of sorting and loading taking just one hour, making four hours as the total idle time in loading, almost enough time to make a lake trip.

A trip was made on this White Bear truck to check up actual conditions, the trip from the store to Lake Shore, the first town on White Bear Lake and the point of first delivery, a distance of 11.8 miles, being done with full load in 42 minutes. Deliveries were then made to the different lake districts and settlements. At the Island the motor needed water; delay, 20 minutes. Thirty-five deliveries were made and 55 miles covered, to say nothing of orders taken. This taking of orders accounts for the length of several stops.

The lake trip was never attempted nor this trade touched before motor trucks came into use. The business has now grown to such an extent that two trucks make the trip every Saturday, one for each side of the lake, and leaving at the same time.

The following is an account of the trip made in the White Bear truck:

Truck arrived at loading platform, 7:40 a. m.; start loading, 10:50 a. m.; leave at 11:57 a. m.

Stop No.	Cause	Length.	Time.
1—	To remove tire chains	1:20	12:06
2—	Pull curtains for rain	1:20	12:16
3—	Deliver 1 box Lake Shore	4:10	12:39
4—	" 1 box	5:45	12:44
5—	" 4 boxes	3:30	12:46
6—	" 1 box	2:10	12:51
7—	" 1 box	1:20	12:54
8—	" 3 boxes	:10	12:57
9—	" 1 box	3:20	12:58
10—	" 1 box	1:25	1:05
11—	Saturday trip. Wait for other truck	22:00	1:08
12—	Delay White Bear	2:20	1:36
13—	Radiator empty. Fill with water	20:00	1:37
14—	Deliver 1 box	1:10	2:03
15—	" 1 box	2:55	2:07
16—	" 1 box	2:00	2:16
17—	" 2 boxes	3:50	2:26
18—	" 2 boxes	5:50	2:36
19—	" 1 box	4:00	2:39
20—	" 3 boxes	6:50	2:45
21—	" 1 box	2:20	2:55
22—	" 3 boxes	8:00	3:00
23—	Stop for photograph	2:00	3:02
24—	Deliver 4 boxes	8:15	3:18
25—	" 2 boxes	4:00	3:32
26—	" 2 boxes	3:20	3:36
27—	" 3 boxes, take orders	11:00	3:39
28—	" 7 boxes and transfer 18 boxes to other truck	26:05	3:47
29—	" 1 box	4:15	4:39
30—	" 2 boxes	5:00	4:46
31—	" 1 box	5:15	5:00
32—	" 6 boxes	10:00	5:06
33—	" 1 box	2:30	5:23
34—	" 3 boxes	4:40	5:28
35—	" 2 boxes	5:40	5:36
36—	" 3 boxes	4:20	5:38
37—	" 1 box	2:20	5:40
38—	" 2 boxes	3:40	5:50
39—	" 1 box	2:50	5:50
40—	" 1 box	5:00	5:54
41—	" 1 box	2:10	6:01

Total running time, 2 hours 10 minutes; total idle time, 2 hours 35 minutes; time gone, 4 hours 45 minutes.

Forty-one stops made, 36 delivery stops; 90 boxes taken, 72 for house delivery.

Average for delivery stops, house delivery, two boxes per stop.

Fifty per cent. of time of trip idle time.

Seventy-eight per cent. of day's work, idle time.

It is only on account of the long haul and the increase in business otherwise unobtainable that a truck can be made to pay as handled by this firm at present, but it can be seen that there are a number of ways in which further saving can be made.

With proper loading facilities alone and an efficient man at the lakes to do the order work, instead of this falling on the driver while the truck waits, the one truck could just as well make two trips a day and thus save the other truck, for Saturdays at least, for other work. It would seem that there should be better facilities for bringing the boxes to the sidewalk from the store, another door or the like, and more thought expended on this branch all around. A man on a motor-cycle at the lake could take orders every day over the whole territory at a fraction of the cost of the truck driver's doing the same thing. A rough figuring at the cost per package is interesting as showing what might be accomplished under right conditions.

Ninety boxes were taken on this load and either delivered or transferred at the lake, an average distance of 14 miles from the store.

The cost of running the vehicle per day is around $9.00, inclusive, so that the delivery cost is around 10 cents per box. The box average is something over 4 packages, so that the package cost is around 2.5 cents; not bad even now. Making two trips a day with the same machine this cost could be cut much lower.

Michaud Brothers and Schoch's groceries also deliver to these lake points, so that lake residents do not have to submit to the high rates of the local summer stores, but buy from the city. These local stores must charge high rates to live, for they are open only a few months in the year as a rule. With the advent of the motor truck with city delivery, these stores will be seriously handicapped in existing at all except for hurry orders, and even then in some cases the city delivery can beat them to it.

Small Groceries Imitate Larger

This is a first indication of how the motor truck is going to influence the small store everywhere, all tending toward a central idea with quick and efficient delivery.

Take, for instance, the groceries located in the Hill district in St. Paul. When the downtown grocers put motor trucks into service the hill residents found that they could order from the bigger downtown stores with cut-rate prices, and the St. Paul larger groceries all carry a side line of meats, and have the order at the door before the corner grocer or butcher near at hand could deliver it, and beside this the average housewife likes to see a prosperous looking motor vehicle with possibly uniformed attendants stopping at her door bearing the name of the fashionable or well-known downtown store, even though the delivery was not quite so early.

Behold, then, the business of the smaller grocers on the hill as they anxiously hot-foot to the motor truck dealer and appear shortly with motor trucks just as speedy and just as imposing as those of the downtown stores. They had to have trucks to hold their business, and in holding it they are surely influencing those about them who have not adopted trucks.

The effect of all this would make another story as, of

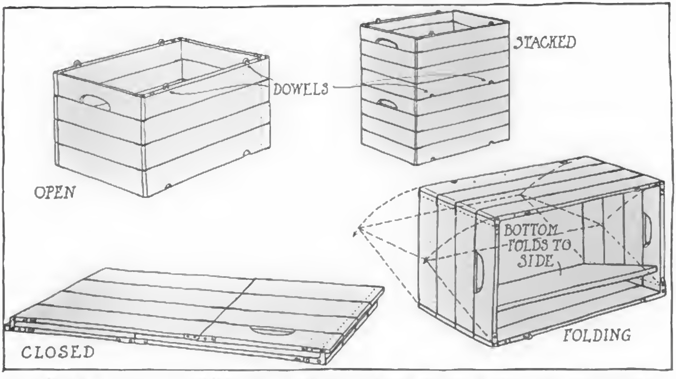


Fig. 7—Showing the Construction of the Boxes That Are Used for Packing Goods Despatched by Motor Trucks in the Grocery Service of St. Paul and Minneapolis

course, the small grocer in "keeping up with Lizzy" and buying a truck, if he cannot use it to give an increased economy over horse delivery, must boost prices to make up the difference, for he is forced to the truck willy-nilly. This increased cost will seriously impair his business compared with those stores so located and run that their trucks save them money instead of losing it unless he spend some brains in fitting a system to his machine which will make it really pay and not be merely a decorative adjunct whose extra expense eats into the advertising account. The downtown firm with many trucks soon learns that it must make its business fit the machines and hence get the earlier advantage. That the hill grocers were so quick to adopt the motor truck after the downtown stores took the initiative is a credit to their business perception, but without the next step of learning how to use them with the least possible idle time, the advantage now gained will be shortlived.

It may seem that a great deal of space has been spent on the grocery situation in St. Paul, but this branch of truck work in that city is so large compared with any other that its bearing on the city's delivery work is important. This one line of work described also gives a good layout for truck comparisons in other lines of service.

Department Store Delivery Work in St. Paul

The delivery work for the department stores of St. Paul is very similar to that of the grocery work in general outline and range. The Golden Rule store, one of the largest, is using motor trucks in its delivery work, having three machines in service, two of 1500-pound capacity and one 1-ton, pneumatic-tired. These are doing the work of 26 horses.

Two of these cars make two trips a day, covering about 25 miles each. One delivers to Macalester, Merriam Park and the Midway district, while the other takes in Hamline, St. Anthony Park and the Agricultural school territory.

The route of the third truck is quite remarkable and well worth noting. One trip a day is made with this truck, leaving at 9:30 a. m. and returning about 6 p. m. Deliveries are made at points in the following districts: South St. Paul (the stock yards district), Iver Grove, Newport, St. Paul Park, Pullman, Red Rock, Highwood, Oakland, and then to all points on White Bear and Bald Eagle Lake.

The trip is from 62 to 65 miles long, according to the load, and in the 8.5 hours an average of 200 stops are made. Actual conditions in this delivery closely approximate those of the White Bear grocery trip, and hence will not be detailed. The trip shows how merchants are taking advantage of the new transportation to increase their business and range of trade.

An actual trip made with a Golden Rule truck delivering to the Merriam Park and Midway district is shown in the accompanying table, this showing a journey of 14 miles with 108 deliveries in 4 hours and 42 minutes, an average of 1 minute 23 seconds per stop.

While this delivery is possible, yet the cost per package is probably more than that of the ordinary delivery. Figuring a $9.00 a day cost on the machine and 152 packages, the cost per package is about 6 cents.

With horses the outlying deliveries of packages cost 6 cents. The Golden Rule claims a cost with motor delivery of but 3 cents per package. One wonders, however, if this figure includes interest, depreciation, interest on investment, insurance, and the like, items which amount in the aggregate to more than the gasoline, oil and repair cost.

Three motor trucks in the outlying delivery have taken the place of 26 horses, 16 being actually displaced and the extra mileage gained making up the rest. The Golden Rule now makes two deliveries a day where it formerly made but one. Cars average 47 miles per day. In the districts handled by motors the business of this firm doubled in four months.

The firm is well satisfied with what the motors are doing for their business in suburban and out-of-town work, covering territory and drawing trade impossible with horsed vehicles. For town work close at hand the Golden Rule finds that the horse is quicker and cheaper. The motor truck is about one-third slower for this work. In fact, few if any downtown firms use their trucks for delivering within a three-mile radius from the store.

All of the loading is done with small hand trucks as in Fig. 5 on the loading sidewalk, and two elevators from the basement shipping room are adequate for present demands.

There are many instances of truck use and usage in

Time Record of a Trip Made in the Golden Rul

Truck arrived at store, 8 a. m.; started on trip, 9:29; loading, 1 hour 29 minutes.

Stop No.	No. Packages.	No. Deliveries.	Calls.	Time of Stop.	Time.
1	2	1		:45	9:46
2	2	1		:20	9:49
3	1	1		1:40	9:50
4	3	1		:45	9:53
5	4	1	1	3:25	9:55
6	1	1		4:10	9:59
7	3	1		1:15	10:03
8	1	1		1:08	10:05
9	1	1	1	2:10	10:07
10	2	1		:50	10:10
11	1	1		:44	10:11
12	1	1		:15	10:14
13	3	1		:30	10:15
14				1:28	10:17
15	5	2		1:49	10:21
16	5			1:15	10:23
17	1	1		1:15	10:26
18	1	1		:10	10:28
19	1	1		:15	10:30
20			1	1:58	10:31
21	1	1		1:30	10:34
22	1	1		2:00	10:36
23	1	1		:45	10:38
24			1	1:10	10:41
25	1	1		:45	10:42
26			1	1:40	10:46
27	7	2	2	4:10	10:48
28	1	1		1:45	10:53
29	1	1		1:05	10:56
30	3	1		1:20	10:58
31		Collect		1:00	11:00
32	3	2		1:15	11:02
33	2	1		:16	11:04
34	1	1		:14	11:05
35	1	1	1	1:00	11:06
36	2	1		:40	11:07
37	3	2		3:20	11:09
38	3	2		1:10	11:12
39	4	1		1:55	11:15
40	3	1		:15	11:18
41	2	1		:30	11:19
42			1	:50	11:21
43			1	2:55	11:23
44	1	1		:08	11:26
45	2	1		:30	11:27
46	1	1	1	2:00	11:29
47	1	1		:15	11:32
48	1	1		3:50	11:35
49	1	1		:20	11:40
50	1	1		:20	11:40
51	2	3	1	2:35	11:41
52	5	2		:30	11:44
53	2	1		:25	11:45
54	2	1		:20	11:46
55	2	1		:15	11:47
56	3	2		1:00	11:48
57	1	1		:20	11:49
58	1	2	1	1:20	11:50

St. Paul which might be cited, but those most important are not necessarily those lines of work which employ the most vehicles, but those cases which teach new lessons in delivery problems.

The J. T. McMillan Co., pork packers, St. Paul, have turned a 3.5-ton truck to work on a very unusual route and on account of a hill have made it pay as against horses on a 1.5-mile run.

This company has an extensive plant located on the river bottoms, but 1.5 miles from the freight depots. During the month of May under adverse road conditions their 3.5-ton truck carried 446,510 pounds of product in 24 working days, its average daily mileage being 30. The cost per day in service, inclusive, was $8.32, displacing three teams that cost $13.27 a day to operate.

This good showing was made possible by so simple a cause as a hill. Between the plant and the freight yards is a hill very steep and two blocks long, though with fairly good surface. With horses this hill is impossible with anything like a normal load, so that they must take a roundabout and longer course to get rid of the steep grade, carrying even then but about 1.75 tons to a two-horse team. This means a 2.5-mile haul for a 1.5-mile distance.

With the motor truck the hill is no obstacle, and with full load and over the vehicle can play with the grade.

artment Store Delivery Truck in St. Paul

59	2	1		:50	11:50
60			1	:55	11:54
62	2	1		:12	11:56
62			1	1:30	11:56
63	1	1		:20	11:58
64	1	1		:25	12:00
65	1	1		:15	12:00
66	1	1		:20	12:01
67			1	2:50	12:01
68	1	1		:25	12:05
69	1	1		:55	12:09
70	1	1		:30	12:12
71	1	1		1:15	12:14
72	1	1		:18	12:17
73	1	1		:43	12:18
74	1	1		:12	12:19
75	2	2		2:12	12:20
76	2	1		:20	12:23
77	1	1		:00	12:23
78	1	1	1	3:30	12:25
79	1	1		:25	12:30
80			1	:40	12:30
81	1	1		:50	12:33
82	1	1		1:00	12:38
83	1	1		3:05	12:40
84	1	1		:50	12:44
85	2	2		:50	12:46
86	3	1		1:03	12:47
87			1	2:30	12:48
88	1	1		:10	12:50
89	1	1		:25	12:51
90	3	1		:23	12:52
91			1	1:10	12:53
92			1	:18	12:55
93	1	1		1:58	12:56
94	1	1		:50	12:58
95	1	1		1:40	1:00
96	1	1		3:15	1:03
97			1	:45	1:07
98	1	1		:33	1:08
99	1	1		3:30	1:10
100	1	1		1:30	1:15
101	2	1		5:00	1:17
102	1	1		1:00	1:22
103	5	1		1:30	1:24
104	1	1		:15	1:26
105	1	1		:20	1:27
106			1	1:00	1:29
107	Lunch			25:00	1:33
108	Return				2:11

Time on road, 4 hours 42 minutes.

Number of deliveries, 102.

Number of stops, 108.

Number of packages delivered, 152.

Average time per stop, 1 minute 23 seconds.

Average time per stop, eliminating lunch time, 1 minute 9 seconds.

Nevertheless the loading item of time is an important one, as was quickly realized by the managers of this firm, who seem to have as rational a view of the motor truck proposition as anyone in the Twin Cities, handling the machine as a business item meant to earn a profit, and not as an advertisement. A crate loading system was tried and, so far as loading was concerned, was a success, but for the driver's sorting of the load on the route, which was not. Extra men are used on the loading and the driver is filled with the notion of saving seconds at stops. Not long ago at a freight loading platform, when the machine was held up for some time the driver became more impatient with each passing minute. At last he exploded.

"Aw, hold yer horses," said the platform man at the first opening in the flow of language.

"We ain't got no hosses; hurry up!" was the rejoinder.

The driver unknowingly hit the key to the successful operation of a motor truck. "We ain't got no hosses: hurry up!"

Overloading Cause of Tire Trouble

The R. E. Cobb Commission Co. is using three motor trucks for local delivery. They often overload to 12,000 on the 5-ton machine, and yet when this statement was made, admitted that there had been some tire trouble and spring trouble. Two teams are displaced by each machine and one and one-half times the territory covered. In hauling cream a load is made up of 100 pound cans, as high as 173 being carried at once.

The chief item with the handling of its product is the gain in service, the ability to get loads off the cars quickly in hot weather. On one hot day the fact of their having a motor truck saved 100 cans of cream from souring through the ability to get the shipment to the plant in quick time and in large lots. At this time the overload expense of a whole new set of tires could have been paid for by the saving of the shipment.

The machines average 40 miles per day and are of different sizes, one 1.5-ton, which has been in use one year; one 3-ton used one year, and one 5-ton used six months. One hour is spent in loading each time, the idle time being 33 1/3 per cent. Two trucks run on Sunday in the ice cream trade. In hauling poultry the horse wagons carried 30 to 40 coops; the motor truck carries 40 to 120. Sixty cans of cream is a full horse load, and with the best horses at that. A helper is furnished on each truck.

The Northwestern Fuel Co. is using two motor trucks in coal delivery fitted with dump bodies. There are no coal trucks in Minneapolis.

The Milton Dairy Co. has in use two 1500-pound pneumatic-tired trucks which are being run with little system except for service which horses cannot do. Thirty-three stops are made in a three-hours' average run, three to five minutes being the average for a stop, the daily average being 40 miles. The truck runs from 9:30 a. m. to 2 p. m., it taking 1 hour to 1.5 hours to load, an obvious waste. With a little business system in connection, the same machines could do twice the work. To merely own trucks does not mean that one is up-to-date. There must be a system to fit suited to the new branch.

In the September story will be discussed the phases of traffic between cities, the interurban branch, and the general situation in Minneapolis.

Making Truck Sales

Dealers Declare Special Truck Salesmen Are Needed; Work Different from Touring Cars

IF you handle pleasure cars and trucks from the same salesroom do you employ separate salesmen for the truck field, and if so, what class of men have you secured and what are your views on the question of separate salesmen?

A PROBLEM confronting many new truck dealers and other dealers in pleasure cars is whether it is advisable to sell trucks and touring cars from the same salesroom. Many truck makers are unsettled on this question. Another question is whether a salesman selling pleasure cars is adapted to sell trucks or if where a dealer handles both trucks and pleasure cars it is not desirable to have two selling forces, one devoting its energies to pleasure cars and the other to trucks.

In order to get the views of dealers who are at present handling trucks and pleasure cars from the same salesroom, THE COMMERCIAL VEHICLE wrote to many of the leading truck dealers in a dozen of the leading cities in the country requesting their views on this topic. On this and the following page is given the first instalment of the answers to the question which is printed at the top of this column, namely: "Do you employ separate salesmen for the truck field, and if so, what class of men have you secured and what are your views on the question of separate salesmen?"

The replies indicate an unsettled condition. The majority of the dealers unite in the one thought that separate salesmen should be used, while there are others who find it best to have the same salesmen handle touring cars and trucks in that if he has customers in the pleasure car field it is easier to sell trucks, and also it happens that a salesman disposing of a lot of trucks very often is able to sell pleasure cars to members of the same firm, or to people connected with such a firm. With many dealers the one thought is that the selling of a truck is so different a problem from selling a touring car that different types of men are needed and the preparation for one class of salesmanship is different from that needed for the other. Here are the opinions:

Trucks and Cars in Same Salesroom

Boston, Mass.—We sell both commercial vehicles and pleasure cars in the same salesroom. We are, however, employing men who devote their time exclusively to motor trucks, as we have been taught by experience men able and capable of selling trucks do not care to interfere with the sale of pleasure cars. Occasionally, of course, these men do sell pleasure cars, but they find it more profitable to-day to devote their time to the sale of trucks.—Kisselkar, New England Branch, H. B. Purdon, General Manager.

New York City.—Our trucks and pleasure cars are handled from the same salesroom and that is the only connection between the two. The pleasure-car salesmen have nothing to do with the trucks and vice versa. The truck salesmen are very high-class men. They are all trained engineers and salesmen as well. We think men of this type are absolutely necessary and we doubt very much if men only experienced in the sale of touring cars will make satisfactory truck salesmen unless they have had several years of special schooling.—Harrold's Motor Car Co. (Pierce-Arrow.)

Pittsburgh, Pa.—A truck is on exhibition in the salesroom with pleasure cars. Truck salesmen occasionally sell their truck customers pleasure cars, but it is a side issue and if a great deal of time is to be spent on the sale it is turned over to the pleasure department. The pleasure car department turns truck prospects over to the truck end. The minimum salary paid to truck salesmen equals the maximum paid to pleasure car men. We do not think a diamond merchant would make a good salesman for a stone quarry.—Packard Motor Car Co. of Pittsburgh.

Cambridge, Mass.—We do not handle our pleasure cars and trucks from the same salesroom—we have different rooms in the same building. The salesman is the sticker. We have tried about a dozen; some of them had never sold trucks or pleasure cars, others said they had sold trucks and pleasure cars, but my experience with them was very unsatisfactory—not any of them could sell a truck. Good truck salesman are as scarce as hen's teeth. I firmly believe in separate salesmen for trucks.—Dodge Motor Vehicle Co.

To Sell Trucks Requires Special Training

St. Louis, Mo.—We do not at present handle pleasure cars at all. The pleasure car salesman, in our opinion, has had training in selling a luxury and the truck field appeals to a different instinct. To sell trucks requires a different training. Some salesmen grasp the difference readily and there is no reason why more should not.—Benoist & Aull.

Cincinnati, O.—We beg to state that we have tried both methods of having our regular pleasure vehicle salesmen sell delivery wagons, and have also tried special salesmen on delivery sales only. We have received the best results from our general salesmen, and although it seems that the commercial department should be handled individually from the pleasure vehicles, it has not proven so in this city. I am quite confident, however, that where trucks are handled it would be necessary to have separate salesmen handle the line exclusively.—Ford Motor Co.

Cleveland, O.—We handle only trucks. We believe that a concern handling trucks and pleasure cars together should have separate salesmen for their trucks and that these salesmen should be specialized in that one line.—Grabowsky Power Wagon Co.

Philadelphia, Pa.—It is our general experience that a salesman selling pleasure cars cannot turn around and sell trucks. The method of going to work is entirely different and the class of men totally dissimilar. The buyer of a pleasure car looks for a somewhat dapper, well-dressed salesman, preferably young, while the merchant will listen to a rough and ready older man who has had business experience and can quote figures and facts; moreover it is not necessary for a truck salesman to have any great mechanical knowledge or be able to drive. Have found that salesmen of other lines of business have made very good truck salesmen.—Continental Motor Car Co.

Separate Salesmen for Both Lines

Chicago, Ill.—We handle both pleasure cars and trucks in the same salesroom, but hire separate salesmen for both lines and do not allow truck salesmen to have anything to do with the pleasure end, as it is an entirely different business and should be separate.—R. S. Mattoon Motor Co.

Cleveland, O.—We have found it extremely difficult to handle the complete details of sales from the same salesroom and by the same salesmen who are satisfactorily placing our electric pleasure cars. There are so many questions, not only of a technical nature, dealing with the commercial car construction and performance, but also transportation costs, rearranging of routes to obtain the best service, and matters of a similar nature, that we have found the most satisfactory method is to effect the final selling through special engineer salesmen working directly from the main office. We are utilizing our pleasure car salesrooms and salesmen in the preliminary work necessary in the development of the prospect. These men, with their knowledge of the local conditions, get prospective buyers interested in our line and arrange appointments for our special commercial car men to take the matter up more in detail. The sales are finally closed by these special men. This method we find decreased the number of special salesmen which it is necessary to maintain in the field, gives a little more direct communication between the customer and the factory, and is gradually educating the pleasure car salesmen to handle the preliminary work more efficiently.—Baker Motor Vehicle Co.

Milwaukee, Wis.—We, at the present time, are not employing a separate salesman on our truck, the Pierce-Arrow, as we do not think it would pay for a dealer who is selling a high-priced truck.—American Automobile Co.

Pittsburgh, Pa.—We handle both pleasure cars and trucks, but employ separate salesmen, and do not believe that the business can be successfully handled with the same salesmen for trucks and pleasure cars.—Pittsburgh Automobile Co.

Chicago, Ill.—I do not believe it is policy for pleasure car salesmen to handle trucks or talk them. It takes a man with an entirely different caliber—one who thinks differently, who reasons how to overcome problems in handling trucks. It takes a person who thinks and sees things quicker in a delivery problem, we believe, than in a pleasure car problem. I do not believe a pleasure car salesman will develop into a good truck salesman. As an example, at the present time we are putting a man to work who has been in the wholesale grocery business—one who has had many difficulties in the delivery problem; he knows there is a value in the commercial car under certain conditions—I am quite sure he will make a good truck salesman; he can be educated to talk of the saving features by the use of the commercial car; we do not care to talk construction and make it our main item or thought.—Velie Motor Vehicle Co.

Better Salesmen Required for Truck Selling

Minneapolis, Minn.—We handle both pleasure cars and trucks from the same salesroom but employ separate salesmen for canvassing. I have found that it takes better salesmen; that is, better business men and those of more experience, to sell trucks than to sell pleasure cars. Think it is absolutely necessary to use separate salesmen for the two lines.—McArthur-Collars-Thompson Co.

Chicago, Ill.—As manufacturers of commercial cars exclusively, we have had no experience in handling pleasure cars and trucks from the same salesroom, but from our experience in selling commercial cars, which is so entirely different from selling pleasure cars, the pleasure car salesman in entering the commercial car field has a whole lot to learn, but any competent man with real sales ability can in a short time qualify as a commercial car salesman, whether his past experience has been in the sale of automobiles or dry goods. In fact, the best salesman we ever had had never handled automobiles and knew absolutely nothing about them and for years had successfully represented one of the largest dry goods houses in the Southwest.—Mercury Mfg. Co.

Philadelphia, Pa.—Beg to advise you that we have discontinued the manufacture of pleasure cars and therefore we only have one class of salesmen selling commercial cars. We believe, however, that the selling of commercial cars is a specialty in itself. The problem must be undertaken from a different selling standpoint.—Autocar Service Co.

Chicago, Ill.—We handle pleasure cars and trucks from the same salesroom. We do not employ separate salesmen for the truck field and the pleasure field.—Franklin Automobile Co.

Chicago, Ill.—We do employ separate salesmen for pleasure cars and trucks and it is my opinion that a man in order to sell trucks must be able to figure transportation problems in order to be successful.—Speedwell Motor Car Co.

San Francisco, Cal.—Our truck department is entirely separate from the department of pleasure cars. We get the best results that way.—Standard Motor Car Co.

San Francisco, Cal.—We handle pleasure cars and trucks and do not employ any different salesmen; our salesmen sell trucks and touring cars at the same time.—Kleiber & Co.

New York City.—Separate salesmen are employed for selling trucks and pleasure cars.—American Locomotive Co.

Automobile Sales Experience Not Necessary to Sell Trucks

Chicago, Ill.—We handle both the pleasure and commercial cars and on the same salesroom floor. However, we maintain a distinct commercial car division with a sales department having a coterie of salesmen exclusively on commercial cars. I believe a salesman will be more successful when confining his efforts to the commercial car exclusively, for the reason that the selling of pleasure and commercial cars, if successfully exploited, requires an almost entirely different line of argument. Of the two types the commercial car is much the harder to sell and requires a much more scientific effort. I do not believe that automobile sales experience is essential. I find the more successful are the men who have had a good general sales experience and make a study of the delivery question as pertaining to the various lines of business.—Studebaker Corporation.

Minneapolis, Minn.—We do not handle pleasure cars here. Our entire time is devoted to the sale of motor trucks, in which our company manufacture two, one with rubber tires for the city and the other with wood-plugged wheels for farm and country service. We believe, however, that if we were handling pleasure vehicles it would be far more desirable to have separate salesmen. This is a day and age of speciality, and the salesman that devotes his entire time to one article must necessarily become a better and more efficient salesman than he would if he had two or three lines of goods to handle.—Avery Co.

Chicago, Ill.—We handle both Packard pleasure cars and motor trucks from the same establishments. The two departments, however, are separate and we employ exclusive salesmen for each.—Packard Motor Car Co.

Two Separate Organizations Imperative

St. Louis, Mo.—In handling pleasure cars and trucks from the same salesroom, as we do in this city, we feel that the maintenance of two separate and distinct organizations is imperative. This is particularly true in the case of the electric. We believe it to be essential that the truck salesmen have a certain amount of technical training; an engineer with commercial instinct undoubtedly makes the best man, and only by the employment of such men will the electric truck come into its own. A very different class is required for the pleasure car. Here extensive technical knowledge is desirable but not essential. A man filling this position must address his efforts to the feminine mind, which is seldom equipped to differentiate between desirable and undesirable mechanical and electrical features, and a cold analysis of the dollars and cents feature of the problem is entirely secondary and carries but little weight against suave arguments based almost entirely on sentiment.—Union Electric Light & Power Co.

The Trend of the Times in Truck Work

A Study of the Conditions Attending the Purchase of a Truck from the Buyer's Point of View—How the Unwary Neophyte May Avoid Innumerable Pitfalls—Part VI

PURCHASING is a science that must be studied just as much as selling, and should not be entrusted to purchasing bureaus.

PRACTICE in horse-vehicle purchasing has no value when buying a truck; the purchase of the latter is a separate problem.

BEFORE purchasing, the whole transportation problem must be analyzed; it is as broad a problem as the railroad problem.

A CRITICAL study of the conditions surrounding the purchase of motor trucks, with the buyer's side in view, is usually a very interesting one to those who may be competent to diagnose each case from its external symptoms. Where the prospective purchaser has already owned and operated commercial vehicles for a sufficient period to give him any considerable experience, the operation may proceed in the orthodox manner in which any other type of equipment may be bought. However, there are very many cases of this kind where the experience gained with the use of machines is not capitalized upon from the fact that the party in charge of the purchase is not intimately acquainted with the details, or peculiarities, of the transportation department, or perhaps may not be competent to judge of the particular requirement in machine equipment to meet the service in demand. Not infrequently the preliminary installation has been made including a number of different makes or types, with the avowed purpose of developing the superior features of the fittest, but from lack of records or from lack of employment of dissimilar machines in similar service, or from lack of ability to analyze critically and extract serviceable information from the data at hand, the entire value originally intended to be gained is lost and the buyer is put on his own mettle to do the best he can. His function may therefore resolve itself into buying entirely upon the basis of low price, or demanding an equipment based upon some fancied superiority, or a preference governed entirely by some abstract or non-essential consideration.

How Most Purchases Are Effected

That purchasing in any field is a science unto itself is well known and appreciated and its importance increases to such a degree in large industrial and commercial institutions as to call for a special department governed by an executive head solely responsible for determining upon the selection of the materials, supplies or equipment required. However, even such specialized means will often fail when the article under consideration is new or novel and the art of its production or the practice of its employment has not sufficiently far advanced to establish its purchase by routine methods. Hence we find that most purchases of motor trucks are effected on price and discount alone with the bare provision that the seller has responsibility sufficient to satisfy the purchasing agent, and in this the latter is sometimes mistaken.

It must not be construed that the statements just made cover the conditions at all times in securing motor trucks through a regularly established purchasing department, but in the majority of cases the purchasing agent is so occupied with his routine responsibilities as to have very little opportunity to become familiarly acquainted with either the equipment or service constituting his requirements, and he usually believes that he is exercising his best judgment by securing machines entirely on a competitive basis. It must also be remembered that of late there have been a number of instances where in large establishments having engineering departments as well as purchasing departments, that the former prepares for the latter a set of specifications covering the requirements, and where an organization has the facilities of such an engineering department mistakes are not so likely to take place as in non-engineering institutions. It may be added also that in the absence of the proper engineering talent some of the specifications prepared for purchasing department service have been wholly inadequate in covering those features of the equipment intended to be purchased which are really critical from an investment and operating standpoint.

Buying Through a Purchasing Bureau

Another condition occurs where a number of associated organizations buy their equipment through a central purchasing bureau or department, in which cases it seldom happens that the operating department in which the requisition originates has the power to insist upon the purchasing department selecting the apparatus which its experience has indicated as desirable, and it has frequently happened under similar circumstances that those departments originally making the requisition do not really know what they want beyond the bare knowledge of the load-carrying capacity of the machines. Hence the purchasing department, acting in an independent manner, has frequently selected for and delivered to those collected operating departments machines which cannot be considered in any other light than mis-applications.

Practically the same remarks apply to large national organizations having branches throughout the country but whose purchasing is done at headquarters and under a policy in which the opinion of the branch manager is not considered, and hence it occurs that an organization of this character may determine upon venturing into the use of motor equipment by purchasing a large number of machines and making delivery of a few to each of its branches in widely separated localities where the local manager may have had no previous intimation of his headquarters' policy or intention. In such instances the local manager is usually relied upon to take the apparatus given him and apply it to the best of his judgment without any advance consideration of where the machine might be utilized to best advantage or supersede the greatest portion of the older equipment previously in use.

Mismanagement the Cause of Bad Results

It may be said in addition that when a single machine or even a few machines are just sent to an isolated locality to be operated without any advance instructions, and in many instances where those in charge of the new equipment have absolutely no knowledge of its peculiarities, gross mis-application has resulted with the net result that the employment of machines is vigorously condemned, whereas the blame justly rests upon the obvious mismanagement.

Where purchases are made as described above through a centralized purchasing department it is frequently found at the operating points that as the motor truck equipment increases, the installation is largely made up of a variety of different makes and sizes which do not harmonize and which have little if any relation to the work performance for which they are intended. These mongrel installations also have the disadvantage that a separate supply of repair parts for each make must be carried in stock, with consequent duplicated investment, and the chances that the mechanical help will not be so well qualified to take care of a varied equipment as it would be if the equipment were standardized, and opportunity afforded to locate consistently, such defects as might develop and eradicate them by scientific effort in the direction of the specific trouble. It will be quite evident that in these mixed equipments there is no logical or rational effort made to study deficiencies when they arise, but that due to what might be regarded as a state of demoralization on the part of the mechanical department taking care of these mixed equipments; trouble and breakage is looked upon as if it were to be expected and no other effort is made than to concern itself continually with current repairs from week to week or the replacement of parts as they break or wear out, where under a properly selected, standardized and uniform equipment the occurrence of trouble would be regarded as exceptional and a consistent effort would exist toward reducing it to a minimum.

Standardizing Basis of Cost Operation

In many of these operating departments where mixed equipments have been purchased under the conditions described above, considerable effort has been expended in the cost-keeping records, but with so many different machines under consideration that it is difficult to resolve the cost of operation into any standard basis for comparison, either with the cost of operation when using the equipment previously in service or with the purpose of determining whether the expenditures made for the service rendered are consistent or not. This condition has been quite a puzzle to a great many of the responsible executives, and particularly in those cases where the employment of motor equipment has altered or improved the service rendered, which is particularly true in the case of the public service companies, since the machines instead of being devices for transporting merchandise are largely used as auxiliary tool equipment to the working forces of these organizations. Hence the existing cost of operation as it may appear on the current records cannot be compared with that which previously existed with horse equipment, since the performance of the equipment has been radically altered. Hence the executives responsible for the efficient or economic operation of the institutions in which the equipment is employed have nothing to use as a basic of comparison, and the question of determining whether the existing cost for the service rendered is legitimate and satisfactory is a very puzzling problem. Furthermore, these records will often portray the cost of operation of two machines of similar size in remarkably different figures, even when the machines are of the same manufacture, due to the peculiarities of the service rendered; the difference is more noticeable where two machines of the same size but of different manufacture are taken into consideration for contrast of operation cost.

Cost of Operation Often Extremely Indefinite

As the result of rather extended critical observation of the conditions just outlined it may be safely concluded that there are very few users, who do not absolutely control the purchase of their equipment and where a mixed installation has consequently resulted, who are able to secure any benefit or advantage from their records of operating cost, notwithstanding the considerable effort, time and money which may have been expended in the keeping of such records. Hence the cost of operation is extremely indefinite in their minds and the general feeling is created that while the machine equipment may be extremely useful, the price paid for the service received is out of all rational proportion. This condition is really brought about more by mental confusion than actual fact and its cause may be regarded as the result of irresponsibility in the matter of purchase if not gross ignorance all around in the matter of application of vehicles to the work.

In numerous cases where large installations are employed, but where the operation and care are more intimately controlled by the ones who assume complete responsibility for the investments they make, very satisfactory and reliable information is available and is made use of in any new purchases, sometimes with an exactitude which is extremely gratifying to those interested in the propaganda of machine use. This latter type of purchaser is usually sought after by those responsible manufacturers who are careful about the reputation of their product, since its employment under such favorable conditions affords opportunity for mutual reciprocation with advantage to both parties, which has a high monetary value. It is from this class of user that commendatory endorsement carries weight with the discerning purchaser, and the cost of operation as secured from such organizations is in strong contrast by reason of its difference below any figures which can be secured from the former type of installation described.

It is not intended to convey the impression that buying through a purchasing department is always encumbered with disadvantages, since there are many notable exceptions where a high state of efficiency prevails. Neither is it to be considered that in all cases where purchases are made, without the aid of a purchasing department, that the equipment is judiciously and competently selected; on the contrary, this is rather the exception than the rule and we may consequently give consideration to some of the conditions which usually prevail where a purchasing department is not available.

Difficulties Surrounding the Prospective Purchaser

In those cases where the prospective user has not previously owned motor truck equipment and where the intended installation is of such size as to lend it importance, he is surrounded with difficulties not usually encountered in any other line of his business. The popular inclination is to judge of motor truck equipment from the general experience gained with touring car use, and nothing could be more fallacious than judgment built up on this premise. The merchandise transportation motor truck has practically no basis of relation to a passenger transporting machine, unless where malpractice is resorted to in distorting the latter to the service of the former, either as a subterfuge or a smart effort of those who are wiser than their generals. Transporting merchandise by motor truck has peculiarities of its own and there is so much misinformation abroad on the subject that it is often perplexing for executives to come to a reasonable decision on the subject. The common practice is to endeavor to satisfy themselves by communication with those previously employing such apparatus, and in this direction they may or may not receive competent information.

Quite a number of purchasers get their first accumulation of information from the tactical employment of motor truck salesmen offering a variety of products, and this process is responsible for many of the tedious negotiations which are evident everywhere, and it is frequently amusing to see the kaleidoscopic changes which take place in the disposition of the intending purchaser from one attitude to another as he develops from one stage to another with the accumulation of his information. The final result is frequently commendable as based on conservative compromise, but in not a few cases the result is ludicrous under the influence of persuasive salesmanship.

Not infrequently the neophyte purchaser becomes so confused under the many influences brought to bear upon him that in self-defence he resorts to a belief that all the machines offered to him are about on a common basis, and he brings into practice the trading instincts developed in his regular line of business and finally procures his equipment as the result of barter rather than a sound judgment based upon a complete knowledge of the apparatus which he selects. The irritated condition of mind into which some executives work themselves when confronted with this new problem frequently leads them to delegate the purchasing function to their subordinates and when this occurs the question arises as to whom they shall select for such a critical performance. It usually resolves itself down into a selection either of the member of their organization responsible for the delivery department or to someone else credited with a more reliable knowledge of mechanical apparatus.

Can the Horse-Vehicle Man Buy a Truck?

When the delivery department executive is appointed to select a machine equipment we usually find his viewpoint entirely warped by the past practice which he has had with the employment of horse vehicles. The routine performance of his present equipment seems so unalterable, or the limitations of what he can do under present conditions have created such a set conviction in his mind, as to render him incapable of completely divorcing himself from his present practices to such an extent as will enable him to comprehend the ultimate utility of a machine application. He may furthermore be influenced subconsciously by a prejudice against the machine from the part he may have taken in the performance required of him with the older type of equipment. He occasionally gives evidence of the belief that since the price of the new equipment is so much greater than what he has been accustomed to pay for the older type that the performance of the machines ought to be practically unlimited, and under the influence of this belief he endeavors to secure a performance in load capacity and mileage out of all proportion to what he has been previously accustomed to, and if he is insistent in this direction he invites defeat of his ultimate project from its very beginning. His practical knowledge of the requirements of his organization creates a disinclination to recede from any position he may at first assume and to regard the judgment of all others concerned with the problem as inferior. He may have been so long master of his department as to resent the interference of others as fatal to his purposes. Usually he has no knowledge of mechanics. He frequently treats the employment of chauffeurs in contrast with horse drivers whom he may have at present completely under his command. He may or may not have been personally interested in the purchase of horse equipment and supplies. There is also the possibility that he may have worthy relatives intrenched in the horse department who are likely to be displaced with the employment of machines. Generally, he has no broad grasp of transportation problems in the abstract, although firm in the belief that he is well informed on the subject. In his negotiations he frequently lays stress on machine failures which have been within the range of his observation, or that of his acquaintances. He may be totally unaccustomed to dealing in projects involving large figures and consequently the cost of machine operation presented to him in bulk form has a drastic influence on his mental attitude; his past experience in the matter of expenditures may have had the limit of a few hundred dollars in delivery matters.

He seldom recognizes the necessity for spare equipment in a machine installation, while the safety horse equipment, which may have been a vital necessity to him, is passed over unobserved. His information on the cost of operation of horse equipment may be entirely based on the casual observation of bills for feed, shoeing, veterinary and other minor items, without any comprehension of the entire outfit from an investor's viewpoint. If not well intrenched in his position with the organization he usually foresees displacement, and the general obstinate characteristics of this type of man become conspicuously evident wherever he has delegated to him the new and important function of determining upon a large investment in motor vehicle equipment.

A Critical Survey of the Mechanical Man

Placing the mechanical man of the organization under critical observation, we usually find that this individual has a strong and powerful reputation to maintain. He has always been regarded as the medicine man about the organization for everything with "works to it," from the wheelbarrow to the cash register, so why should he not be an authority on motor trucks, since he has recently read up on the principles of the internal combustion engine or chemical reaction in storage batteries and accumulated a great variety of miscellaneous information in this direction? He has also acquired an extensive collection of catalogues, both ancient and modern, and may have devoted considerable time to the observation of machines exhibited at motor shows.

Perhaps he owns a touring car or has a friend who has purchased one or more. In fact, the matter of selecting motor trucks is his particular province. Who else could possibly know anything about the matter, at least in his organization? He not infrequently regards all motor vehicle vendors as upstarts and he has quite determined in his mind that under no circumstances will they be able to take advantage of him. He is even just as obstinate as the horse man, only he is more difficult to negotiate with on account of his education, training and broader experience. This new mechanical toy, the motor truck, has a fastination in his case which renders him a formidable man to cope with. He has been asked by numerous friends in connection with touring car purchases for his valued opinion. Now that his firm requires motor trucks this problem is legitimately his without any right of interference from anyone. The fact really is that his judgment may be inferior on the subject on account of his conceits and prejudices. The problem is actually a broader one than he has any idea of and he may not be broad-gauged enough to meet the requirements of the responsibilities delegated to him. As a whole, he generally regards the motor vehicle industry as undeveloped and that he has the right, by virtue of his mechanical experience, to know as much about it as anyone engaged in it.

The Criticism is None Too Caustic

The foregoing criticism does not apply to a great many cases where competent and qualified men undertake to secure equipments strictly on their merits without reference to price and having a complete knowledge before them of the efficient application of the machines which they secure, but it cannot be denied by those who encounter the situation from day to day and upon whom falls the burden of securing the introduction of machines, either from the viewpoint of the executive responsible for the proper conduct of motor truck producing organizations, or upon the individuals engaged in the active negotiation of sales. The criticism is none too caustic to present clearly the difficulties which are encountered and they are set forth as above to give those interested in both the purchasing and sale of machines a fair picture of the encumbrances which too frequently surround negotiations which ought to terminate for the good of either party.

Law of Good Tackle

All State Motor Vehicle Laws Contain Specific Requirements Regarding Equipment to Be Carried

Legal liability is only consequent when reasonable care is not used. The question is: Was such ordinary care exercised by the party

THE term "good tackle" we have seldom heard used in reference to the automobile and its equipment, yet this term is over a century old and is applicable to-day and in full force in reference to motor trucks and all other classes of motor propelled vehicles. All of the state motor vehicle laws contain specific requirements regarding equipment, and, of course, it is necessary for a motor truck or other commercial vehicle to possess all the attachments and devices demanded by the statutory law. But if the statutory enactment is complied with, is it necessary for the owner of the vehicle to do more? Yes, he must see to it that all his tackle is good, and we mean by tackle not only equipment but parts, material and construction.

The common law for centuries required all travelers on the public highways to have good tackle, which term included gearing, shafts, harness, lamps, wheels, axles, bolts—in fact, almost everything connected with a carriage or vehicle which might get out of order if imperfect. This same common law rule is in force to-day and applies to automobiles and motor trucks. It operates on the manufacturer, owner and driver of the motor truck, as each is under legal duty not to permit the use of the vehicle on the public highways unless the vehicle is sound and roadworthy in the material parts and construction. In other words, it must have good tackle and equipment.

The law requiring good tackle originally applied to a type of vehicle which of course was not propelled by power and of necessity the tackle was very materially different from that used in the construction and operation of motor vehicles. Although we have not now shafts and harness, we have other more improved substitutes, but we still have gearing, axles and wheels. We also now have a steering apparatus which is depended upon to keep the vehicle in a safe path. Should this not be good in its material and the way it is put together and injury result from a defect, someone would be liable for damages.

Commercial motor vehicles must necessarily be constructed strong, and it is the duty of manufacturers of these machines to place reliable and safe material and equipment in them. This duty we are glad to observe has been lived up to in the United States and abroad. The rule governing manufacturers of machinery has been stated by eminent authority as follows:

> "When the builder of a carriage, or the maker of a machine, has delivered it out of his own possession and control to a purchaser, he is under no duty to persons using it as to its safe condition, unless the thing was in itself of a noxious or dangerous kind, or, it seems, *unless he had actual knowledge of it being in such a state as would amount to a concealed danger to persons using it in an ordinary manner and with ordinary care.*"—Pollock on Torts, page 632.

Inasmuch as the manufacturer of a motor truck knows more about the material and construction of his own product than the public or those to whom he usually sells his vehicles, his status in relation to those who purchase his cars involves a confidential relation. Trust confidences are reposed in one who produces a motor truck, and the purchaser has the right to assume that the vehicle possesses no latent defects rendering its use and operation unsafe to either person or property. The manufacturer knows the quality of the product he is placing on the matter. He is aware of the materials and labor which enter into its construction. It is within his power to substitute an inferior material, which can be covered up with paint. He also has control over the quality of the labor he employs. The public ordinarily are not technically versed in automobile construction, therefore the legal doctrine of *caveat emptor* does not apply as it does in purchasing a horse.

This relation of confidence existing between the producer and purchaser of a motor truck is looked upon by the law with a great deal of jealousy, and protection is afforded the party who placed his confidence in the superior knowledge of another. All contracts between persons holding trust relations are most strongly construed in favor of the fiduciary.

Intimately connected with the duty of possessing good tackle and equipment is the duty of those in control regularly to inspect motor trucks and overhaul them when required, for it is only by inspection that one is able to ascertain in advance the cause of a possible accident or that some part of the vehicle or equipment is out of order. Therefore a system of regular inspection should be carried out. Should an accident occur because of a break, causing damage to another, it would be found that the ability to introduce evidence in court to the effect that regular inspection of the truck had been made would assist materially in convincing the jury that reasonable precaution was taken. The law does not make owners of motor trucks guarantors and liable in cases of *all* injuries. It is only where lack of reasonable care exists that there is legal liability. To inspect regularly a motor truck, to ascertain if everything is working properly, is to exercise reasonable care. Not to do this constitutes a failure to exercise due care and is negligence. It may be said that it has been held that the fact that gearing or tackle acted wrongly on a previous occasion is evidence of negligence on the part of the owner, and may be sufficient to render him liable for damages caused thereby. (See *The European*, 10 L. R. Prob. Div. 99.) But the mere fact that some of the gearing gave way, or that some part of the vehicle broke down and injury resulted, would not be negligence *per se*. (See Doyle vs. Wragg, 1 F. & F. 7.)

The question in each case is: "Was ordinary care exercised?" The rule is, "If damages are inflicted by reason of the breaking of the carriage or tackle of the traveler on the highway the traveler or owner of the tackle *is liable only on the principle of want of ordinary care.*" (See Vol. 1 Thomp. Neg., p. 81.)

Care should also be exercised in providing all the necessary fixtures required by the state motor vehicle laws, such as adequate brakes, lights and a suitable horn or other signalling device. The most important of these requirements is that demanding proper brakes. To operate a motor truck with a brake out of order or with one which will not stop the vehicle within a reasonably short distance at the ordinary traveling speed is negligence.

THE Wolverine-Detroit light delivery car described in these pages in the July issue will make a complete turn in a circle 34 feet in diameter. The body dimensions are 64 inches from back of the driver's seat to the end of the frame, 68 inches from the back of the driver's seat to the rear end of the body, and 45 inches from the back of the driver's seat forward to the radiator. The standard body space measurements are 40 by 63 inches. The standard speed is 17 to 18 miles per hour.

THE Ideal Commercial Car Company, Akron, Ohio, is preparing to market a 1000-pound delivery wagon, which vehicle is being designed to care for an overload if necessary. A simple form of transmission is to be used.

Daimler 105-Horsepower Tractor in Agricultural Contest

New English Tractors

New and Improved Types of Agricultural Motors Exhibited at the Annual Show at Doncaster

LONDON, July 6.—The seventy-third agricultural show organized by the Royal Agricultural Society of England took place at Doncaster July 2 to 6. The display, both as regards numbers and variety, surpassed last year's show, there being 200 self-propelled vehicles, including steam tractors and steam and gasoline trucks. The agricultural tractors running on either gasoline or kerosene, varied in size from 105-horsepower to 8-horsepower. Unusual interest centered in the gasoline tractors for ploughing and which machines may also be used for hauling loads, driving machinery, such as threshing machines, straw cutters, grain grinders, etc. These tractors plough ground at $1.38 per acre in some cases, the cost differing according to the design of machine and the nature of the soil. Some of the smaller tractors haul four and six-furrow ploughs and some sixteen and twenty-furrow groups. The Daimler Co., Ltd., Coventry, has three types of vehicles suited for agricultural work, a 105-horsepower six-cylinder sleeve-valve tractor, a 36-horsepower four-cylinder sleeve-valve tractor, and a 3-4-ton truck chassis for load-hauling work; the cylinder dimensions for the larger machine being 150 millimeter bore by 150 millimeter stroke, and for the smaller 120 millimeter bore and 150 millimeter stroke. The former has three forward speeds and the latter four.

This machine ploughs 10 acres a day on a gasoline consumption of 3 gallons per acre, and the cost, including gasoline, oil, driver's and ploughman's wages, interest on capital, depreciation ,repairs and insurance, works out approximately to $1.38 per acre, when working on two-horse land, and at the rate of about 10 acres a day. Both the large and small machines are fitted with pulleys at the rear, so that in addition to ploughing, harvesting and general hauling work, they can be employed for driving stationary agricultural machinery; the driving pulleys can be run at the different speeds provided by the gearboxes.

The following table shows the actual cost of direct ploughing by means of the 36-horsepower Daimler tractor: Assuming ground as two-horse land, tractor can plough 10 acres a day, or 1½ acres per hour.

The Ivel Three-Wheeled Tractor

USING GASOLINE AS FUEL, PER DAY.

Gasoline, 1¾ gallons an acre, at 25 cents a gallon	$4.37
Oil, 1 quart to acre, at 37 cents a gallon	.93
Driver's wages, $1.50 per day	1.50
Ploughman's wages, $1.00 per day	1.00
Interest 5% on Capital Cost of Tractor and Ploughs—$2,500 for Tractor, $400 for Ploughs	.47
Depreciation and Repair 25% on capital cost, including cost of spare shares, $29,000 (taking 300 working days per year	2.41
Insurance against Fire, $15 per year	.05
Cost per Day, using Gasoline as fuel	$10.72
Cost per acre	$1.07

USING KEROSENE AS FUEL, PER DAY.

Gasoline for starting, 2 gallons per day	$0.50
Paraffin, at 8 cents a gallon	2.08
Oil, 1 quart to acre, at 37 cents a gallon	.93
Driver's wages, $1.50 per day	1.50
Ploughman's wages, $1.00 per day	1.00
Interest 5% on Capital Cost of Tractor and Ploughs—$2,500 for Tractor, $400 for Ploughs	.47
Depreciation and Repair 25% on capital cost, including cost of spare shares, $29,000 (taking 300 working days per year	2.41
Insurance against Fire, $15 per year	.05
Cost per Day, using Kerosene as fuel	$8.94
Cost per acre	$0.89

John Fowler & Co., Ltd., of Leeds, have sold 13,000 road engines to date. The power unit is mounted over what in a steamer would be the boiler barrel, and is of the four-cylinder horizontal type, the valve-operating gear being by over-head tappets from cross camshafts. On the off-side of the crankshaft, an inverted cone clutch of large diameter is mounted, a large-diameter flywheel being accommodated at the other end of the same shaft. The speed-reduction is by a spur-gear train to internally-toothed gear as a final drive. The final spur pinions are mounted directly over the back axle, and the whole final gear drive is entirely encased. The carbureter and throttle arrangements are situated amidships, immediately over the crankshaft and in the middle of the engine, a special starting device in the form of a bevel-driven shaft running back into the driver's cab.

The smallest of the two kerosene tractors of Marshall & Sons, Ltd., Gainsborough, is fitted with a two-cylinder engine developing 30-35 British horsepower, and the larger has a 60-70 British horsepower four-cylinder engine, though the success which these machines have attained has mainly been the result of their excellent performances in the large grain-growing districts of Canada, Australia, the Argentine, New Zealand, South Africa, Russia, and many other places abroad. With the small tractor a four-furrow plough can till an acre at 87 cents, and 77 cents with a six-furrow implement, these charges covering the cost for oil, fuel, labor and incidentals. When driving a full-sized finishing threshing machine, straw elevator, and six-knife chaff-cutter, the same type of tractor showed a fuel consumption of 12-14 gallons per day of about 9 hours. In another test 860 bushels of oats were threshed in 6 hours on a fuel consumption of 10 gallons. Taking the average figures of carefully recorded runs in this country, it has been found that the paraffin consumption per gross ton-mile hauling with the small tractor is .3 pint, and .4 pint with a large machine. These tractors are provided with two-speed gearing, giving speeds suitable for ploughing and hauling. Power is transmitted to both the driving wheels by a clutch, bevel gearing working in an oil bath, and a train of spur wheels. The engines work on ordinary kerosene or gasoline, and the simple type of carbureter fitted is easily adjusted to either class of fuel. As regards ignition, both a battery and magneto are provided, the former being used for starting purposes, but is cut out and the magneto switched in when the engine reaches its normal speed. Separate waterjackets are provided for the cylinders, through which a continuous circulation of water, kept at a low temperature by the cooler in the front part of the machine, is maintained by means of a centrifugal pump.

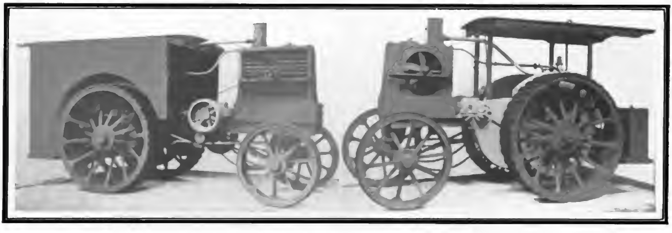
Daimler 36-Horsepower Agricultural Tractor

The number of acres a Marshall tractor can plough in a given time depends on so many varying conditions, that is is impossible to reply to the simple question frequently put, "How many furrows can your tractor pull?" with as simple an answer. So much depends on the type of plough used, and the correct setting, the surface to travel on, the kind of soil and its condition, the width and depth of the furrows, whether the land is level or hilly, the length of furrow, and skill of the engineer. Allowing for turning at the headlands, we may assume a ploughing speed of 2 miles per hour, when the amount ploughed by one furrow will be as shown in the following table, for different widths of furrows:

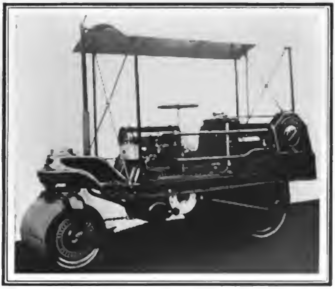
Furrow Width	Acres per Furrow. 2 miles per hr.
9 inch	0.198
10 inches	0.222
12 inches	0.264
14 inches	0.308

Thus using a ten-furrow gang plough, 12-inch bottoms, 2.64 acres are ploughed per hour.

It is impossible to state what the working expenses will be without an accurate statement of all the working conditions, and these will vary greatly in different localities. From an actual test on an English farm, under ordinary working



60-70-Horsepower Marshall, Showing Right and Left Sides



Small Barford & Perkins Land Roller

conditions, and using a six-furrow plough, 10-inch bottoms, 6-inches deep, in stiff stubble land, the cost of ploughing 21½ acres was as follows:

44 gallons paraffin, at 12 cents per gallon	$5.30
2 gallons petrol, at 25 cents per gallon	.48
1½ gallons lubricating oil, at 37 cents per gallon	.54
Grease, cotton waste	.36
Water	.48
Engineer's wages	2.96
Ploughmen's wages (2)	3.94
Interest and depreciation	1.65
Total cost for 21½ acres	$15.71
Total cost per acre	$0.74

Further improvements have been made in the design and construction of the various types of Universal agricultural tractors, of Saunderson & Co. The smallest is driven by a 6-8-horsepower motor. It is suitable for hauling a one-furrow plough, or for hauling loads up to 1.5 tons, as well as for driving small stationary machinery. The 14-16-brake horsepower size is fitted with steel rear driving wheels 4 feet in diameter and 12 inches wide, and can plough with a three-furrow implements, haul a 6-foot cultivator or binder, two mowers or harrows, will drive a 4-foot threshing machine, and will haul 2 to 3 tons on the road. When empty it weighs 4256 pounds. The 28-30-brake horsepower engine is spring mounted on its four wheels. Three speeds in both forward and backward directions are provided, and a device is fitted for locking the differential gear from the driver's seat. It can plough four furrows, hauling a 7-foot binder or two mowers, driving a full-sized threshing machine and chaff-cutter at the same time, while for ordinary haulage work it can haul 6 tons in a trailer. The largest tractor is a 45-50-brake horsepower motor. It is capable of ploughing with a six-furrow implement at a fuel cost of less than 25 cents per acre, and can plough an acre in 34 minutes. The writer recently saw an interesting 24-hours' continuous ploughing and pressing trial. The plough used was a four-furrow implement, taking 9-inch furrows, and was hauled in front of a 36-inch five-wheeled presser. During the 24 hours 20.85 acres were ploughed on 69½ gallons of petroleum and 4½ gallons of gasoline. These consumptions work out to less than 3.5 gallons of petroleum and 1.75 pints of gasoline per acre ploughed.

One thing that was noted as most remarkable during the show was the number of heavy steam wagons fitted with rubber tires, which were formerly tired with steel.

Thos. Green & Sons have a 5-ton motor roller and 24-inch, 30-inch, and 36-inch motor lawn mowers. The roller is driven by a two-cylinder gasoline motor, arranged transversely in the frame, the power being transmitted through a two-speed gearbox to a cross shaft, and thence by a roller chain to the rear roller. The machine is provided with a pulley for driving stationary machinery and it may be equipped for burning paraffin fuel. The 36-inch and 30-inch lawn mowers are suitable for large lawns, ball grounds, etc., and are also well adapted for use on grounds that are broken up by flower beds, etc., as they can be steered with the greatest accuracy. The grass boxes of these machines are fitted with a patent delivery apparatus, so that they can be emptied without stopping; and the hinged front portion can be lifted clear of the ground when the machine is required for use as a roller.

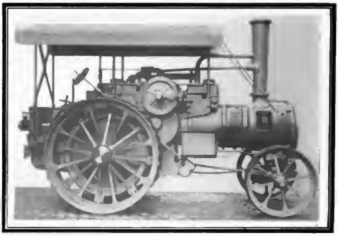
The 18-20-horsepower Ivel three-wheeled agricultural motor was shown driving a 4 foot 6-inch threshing machine. Ever since its introduction some 10 years ago the Ivel has occupied a prominent position. The cylinders are provided with movable heads, thereby facilitating cleaning of the pistons and also the waterjackets. An interesting feature is a new type of a hood, so arranged that it can be pushed over to one side when required or make adjustments to the engine or gearbox. The Ivel uses two or three-furrow ploughs. Its weight is 3920 pounds. The cost of ploughing with it varies. By actual trials in England with a three-furrow plough, on medium soil at a depth of 7 inches, it ploughed 6 acres in 9 hours. The cost follows:

20 gallons of kerosene or paraffin, at 8 cents	$1.68
½ gallon of lubricating oil	.37
Driver's wages	1.25
Ploughman's wages	.75
Depreciation, interest on outlay, renewals, etc	1.50
	$5.55

Several types of gasoline road rollers and land rollers were shown.

Three of their patent water-ballast motor rollers were this year exhibited by Messrs. Barford & Perkins, Ltd., Peterborough, who are pioneers in this type of machine. The largest roller on view weighs 8.25 tons when loaded. This size is a favorite one with English surveyors, and many are at present in use employed for all kinds of road making and repairs and also for tar macadam, asphalt, Ferromac, Rocmac, etc.

The second roller weighs 5.25 tons loaded. This type is one very largely used abroad, and is also employed in Great Britain for patching work, district roads and private roads, while it can be supplied with an interchangeable light cylinder for grass work. The third of these roller machines is a wide roller, very light, and intended for agricultural purposes. Messrs. Barford & Perkins are making twenty sizes of rollers, varying from 14 tons to 1.5 tons in weight.



50-Horsepower Kerosene Fowler Tractor

The Demonstration

Certain Circumstances Only Render Actual Demonstrations Advisable and when Specially Requested

Time and money are often wasted over useless displays of comparison of speed, etc. It is far better, in most cases, to use pencil and paper.

NEW YORK, July 15.—At a recent meeting of the Motor Truck Club in this city Charles E. Stone read a paper on the subject of truck demonstrations, in which he said, in part:

"While I am not a great believer in demonstrations, it is often a very excellent thing to run a truck about and show it, and in this work I wish to make a distinction from demonstration work. Often a merchant is too busy or at first indifferent to call at the truck sales room to inspect the vehicle; the next best thing to do then is to take the machine to him; in this manner an inspection may be made or some enthusiasm aroused. Often during such inspection tours it may be thought advisable possibly to take a load or two for the merchant, but this does not come under the head of demonstration work. Under certain circumstances I believe that demonstrations are advisable and necessary and should be given to determine:

1—If capable of being manœuvred readily at loading or discharging point, or through narrow streets.

2—If capable of being fitted with a certain type or size of body.

3—If capable of hauling its load up exceptional grades or over road conditions of a trying nature.

4—To determine whether or not the delay at ferries or docks or other terminals is so great as to offset the truck's advantages.

5—To determine whether or not the spring action is not too severe for the character of the load to be hauled.

6—In laying out new work for the truck, where such work has never before been attempted, to determine the possibilities.

"Under no circumstance should long demonstrations be granted; let us relegate to the scrap heap for all times the old idea of a month or even a week; a day or two is quite enough to determine definitely anything we wish to bring forward and the rest is largely a matter of mathematics.

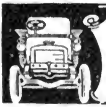
"The old view that a demonstration would indicate the operating cost of motor trucks has long since been exploded; the only thing it shows is the ease with which the machine can be operated, power and spring action—absolutely nothing else.

"The majority of demonstrations as given to-day could be more economically and quickly made with a pencil and paper: given the character, size and quantity of the material to be carried, the distances and roads over which it must go, the number of stops to be made; and it then becomes a simple problem in addition, division and multiplication to determine very accurately the cost per ton or package, for we know from experience the life of the various members, the speed under all conditions, the carrying capacity, etc., necessary to estimate the cost of every factor entering into the operating expense of the vehicle. In many instances our habit of demonstration, particularly where we afterward render itemized accounts, leads to trouble, as the merchant in place of viewing the performance of the truck as a whole simply selects one or two items, probably ones which have no bearing upon the real value of the machine, and compares these items one with another on each report. Of what use, for instance, is it to compare the speed made by different trucks up a certain hill, or the one item of oil or gasoline or grease? An ungoverned motor might win in such competition but in the long run prove extremely expensive; another motor might use more oil but far less gas, or its tire expense be less than another. Much care must be exercised in making reports and no demonstration should be forced upon the prospect. Having made up one's mind to grant a trial, every firm should see to it that the truck appointed for the work is right in every detail; there should absolutely be nothing the matter with it to cause the salesman to apologize or explain. How often have I had to state that the governor was not working on this truck or that we were hard pressed for a spare machine and had to take this old thing which needed overhauling. Excuses for a manufacturer's demonstrator do not go; you may think you can get away with it, but there is always some impression left in the mind of the prospective buyer which may have an undesirable effect.

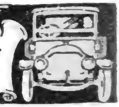
"We in the truck industry are inconsistent in another very vital particular; namely, as to the personal appearance of our salesman. Our sales force goes forth well dressed—that is, the human part of it, but the silent salesman, the truck, more often than not, barely has enough paint left on it to cover about half the metal, and with a body much the worse for wear and more than likely festooned with coils of old rope and string comes chugging and snorting up to the door of the intended purchaser. Is it any wonder that the merchant is loath to go near the thing for fear of becoming soiled beyond hope of the cleanser? If it is thought desirable for our salesmen to dress well in place of rags, why do not our demonstrating trucks appear likewise in keeping with the standard and reputation of the companies behind them?

"And last, but far from least, let me plead with you for the employment of a different class of men to drive these demonstrating vehicles. More often than otherwise the drivers are not accompanied by salesmen and it develops upon them to explain the workings of the machine and its details of construction, therefore we see the importance of men capable of so doing in an intelligent and interesting manner. The demonstrating driver should likewise be capable of operating the truck as an expert; motors should be started without the mighty roar we so frequently hear, and when the gears are shifted the fact should hardly be apparent as far as sound is concerned. No matter how experienced, the operator should always endeavor to make the prospective purchaser believe that it is the truck and not the driver who is performing miracles. The driver, like the salesman and the truck, should also have a standard for dress and department.

"One year ago I read a paper before this club on the subject of demonstrations and at that time advocated most strongly the idea of a charge for all such work. My views have not changed a particle on this point and I am glad to note that the National Association of Automobile Manufacturers recently approved a scale of charges for such work and it is to be hoped that they will see to it that some means is provided to cause its members and representatives to abide by it. I have watched with interest one concern in this city which will not so much as give 1 day free, and it has not lost business by such a method. I believe it has saved a large amount of money and the firm stand has only served to establish it on a better footing with those whose business it has solicited. To my mind, if every club member put into operation some slight modification of this company's attitude on the demonstration question it would result in immense benefit to all; but it is essential that all should do it—not a few."



The Editor's Viewpoint



TRUCK STANDARDIZATION WORK

A FEW so-called engineers and others in the motor truck field have been endeavoring to criticise and belittle the work of the standard committee of the Society of Automobile Engineers in its work of trying to organize truck manufacture and facilitate it by the use of standard-sized parts wherever possible. Some of these critics have gone so far as to assert that the truck engineer would soon be eliminated from his position if the wave of standardization kept moving onward; they went so far as to charge the standard committee with hampering the development of the truck industry by retarding inventive genius and prescribing limitations for the field of truck evolution. Nothing could be further from the actual work of the standard committee of the society. It has not any desire to place limitations on the field of activities of truck engineers or anyone connected with the truck industry except in so far as such activity are at general variance wtih accepted practises and only then does the work of the committee become recommendations and not commands.

The work of the committee and its many sub-committees has been grossly misconstrued. It has been charged with offenses which it did not possess a symptom of thought of. The work of the committee has been solely one to reduce the cost of manufacturing trucks and also reducing the cost of maintaining the trucks after they are sold. The committee has reduced the number of lock washers from over 1,600 different sizes and types to a hundred or more; it has reduced the sizes of steel tubing from the hundreds down to fifty or more; it has standardized tire sizes and wheel dimensions so that now it is not necessary to buy new wheels if you want to change the make of solid rubber tire on a truck; it is aiming to standardize carbureter flanges so that it if different make of carbureter is to be tried it will not be necessary to design and manufacture a new intake manifold in order to try it; it is aiming to standardize water and gasoline connections; and in a word is aiming at simplifying the number of parts which at the present time has been so great as to almost precipitate a crisis with several users.

The work of the standardization committee is proving of special value to the truck designer, it is simplifying his work and making it possible for him to use additional activities in the field of engineering research if he feels so inclined. There is nothing compulsory about the work of the committee, it is merely selecting the opinions and practises of the many and recommending them as general practises for all. The work is but a regulation of what would eventually come if the different makers were left to themselves. It is but a hastening of progress and at the same time giving large economy to both maker and users. Those who have followed the standard recommendations agree that they are saving money every week by reduction in the cost of manufacture.

ECONOMY IN FLORISTS' TRADE

THE florists have been slow in taking up the commercial vehicle for delivery work, due partly to the spasmodic nature of the business and also to the nature of the wholesale trade. The florist's trade is largely a seasonable trade. In June demands are excessive due to weddings and other summer festivities. The Christmas and New Year season is a busy one, and the sailing of every boat and each unexpected exigency puts an immediate demand on the florist for dispatch that makes the motor delivery a prime essential to him. The purchasers in the floral trade are generally fastidious. They buy in the middle of the afternoon and expect delivery by dinner time in a suburban center. They place an order in the forenoon, change it in the afternoon and want delivery for a dinner or theatre party. They give orders for a boat an hour before its departure. These and hundreds of other examples show the exigencies of the business—exigencies all of which demand quick service and certain service. For this reason the motor vehicle is specially suited.

One other reason why the motor wagon is so well suited to this field is that it is impossible to run delivery vehicles on scheduled circuits. The route followed today is not followed to-morrow or next week as it is in the grocery and laundry field. It is one class of buyers to-day and perhaps an entirely different class to-morrow The circuit of to-day may call for a trip of 30 miles while that of to-morrow will demand a service of 135 miles. It is only the motor vehicle that can cope with such widely varying conditions and give that dispatch which the buyers demand. It would be impossible to maintain a fleet of horse vehicles of sufficient flexibility to take care of such strenuous services. The daily distance of horse travel is prescribed, his limits are placed and he cannot go further, whereas with the motor vehicle it is equal to the demands of 24-hour service if necessary.

There is one other reason for the use of the motor vehicle in florist service, namely, that the goods can be delivered in better condition in cool or hot weather than with horse service. In summer the speed is so much greater that they reach the buyer in a fresher state, and in the winter, with its low temperatures, it is possible to use the exhaust gases and so obtain any desired temperature.

THE TWIN CITY FIELD

MOTOR truck makers are more and more realizing the necessity of studying the field in which their vehicles have to operate. They have grasped the fact that Pittsburgh, Cincinnati, Kansas City and San Francisco service is entirely different from New York, Chicago, Boston and Philadelphia. They have realized that while physical conditions largely affect the operations of trucks there are scores of other city problems of a local nature that have to be analyzed before a comprehensive and efficient sales campaign can be conducted. This week the COMMERCIAL VEHICLE presents the first of a series of articles on the truck field in Minneapolis and St. Paul, based on data obtained by a staff representative who made a personal study of conditions and requirements. This analysis shows the difference in truck requirements of two cities but 10 miles apart and shows how imperative it is for the local dealer to not only know the requirements of one but also of the other.

The fact that Minneapolis uses larger trucks than St. Paul because its streets are level, whereas those of its sister city are hilly; the fact that greater speed is required in St. Paul than in Minneapolis because of the residential situation; the fact that pneumatic tires are needed in one city and solid rubber tires in the other; the fact that one city is built up with citizens of one nationality and with their particular characterizations and the other city with an entirely different race, having different mental natures; and the fact that in one city the truck will replace two-horse vehicles and in the other city three-horse vehicles all go to show how imperative it is for the truck dealer to thoroughly anaylze and how essential it is for the truck makers to know the requirements of the different cities so that their manufacturing department can shape its plans for the year accordingly. The wise salesman will only sell the machine where it is suited for the work. He is looking for his profits in repeat orders, which will invariably come if the vehicle is adapted to the work. On the other hand, if the vehicle is not suited to its owner's work and conditions it will not prove satisfactory, and from start to finish it will be a losing advertisement, one which it would be better not to be connected with at all.

THE AGRICULTURAL MOTOR FIELD

AMERICAN truck makers are slow in taking up the field of the agricultural motor. True, one or two firms that have never been counted in the motor car manufacturing field are producing largely for the big farmer of the West, yet the standard truck maker has to date kept away from this field and has preferred to rush into the fire department field, where so much of the work is special-order work that is generally quite successful in disorganizing factory systems and production plans. With the agricultural motor it is quite a different problem. It is a standardized machine, one that can be produced for the vast grain-growing states of the Mississippi valley and in the same form sold to the business farmer in the Canadian West. The foreign maker has taken up the agricultural motor with avidity. He has held his annual competitions, where the products of Europe have met in contests. He has directed the public to his product by these tests. He has obtained official figures on fuel consumption, on speed of performance and on cost of work. He has catered to the enormous field in Western Canada and has gone so far as to foster annual competitions there. He has taken a similar stand on the South American field, on the African field and on the Asiatic field. The result is that the business has grown by leaps and bounds, the missionary work has been done and the big farmer is to-day convinced of the adaptability of the motor. But this has barely scratched the surface of the field. The small farmer is to-day demanding motor power. The farmer with 320 acres, his larger brother with 640 acres and those with double this holding are asking for motor vehicles of a light-weight type. The field for such work is boundless and it is ready to be taken advantage of. It only calls for the activity of the regular truck maker and if he does not seize the opportunity then the old-time makers of agricultural machinery will step into the breach.

THE OVER-MOTORED TRUCK

MANY truck engineers to-day realize that more injury has been done to the motor truck industry by putting too powerful motors in their chassis than fitting them with under-powered power plants. With many it has been a repetition of the pleasure-car days, putting in big motors in order to make sales. The big motor appealed to many. They were asked if their truck could carry a 50 or perhaps 100 per cent. overload. With pride and confidence they answered positively. The demonstration was made, the overload handled and perhaps a sale made. But the continual performance was not satisfactory. Soon the tire expense forced itself on the owner. Why should it be so much greater than with his fellow citizen's truck. He did not stop to consider that while the motor will care for a 50 per cent. overload the tires will not. But the troubles went further. The powerful motor soon began a wrecking program throughout the entire truck. The useless power gave high speeds which wrecked the chassis parts, strained the frames and broke the springs. Maintenance became abnormally high and the truck was blamed—blamed for costly upkeep, blamed for the mistakes of the maker.

Contrast with this the truck with the low-powered motor. It will propel the truck at a legal speed and no faster. This protects it from possible rack and ruin due to overspeeding. It will carry the standard load but not the overload; this saves tires, saves the truck parts and reduces maintenance. The owner may not be aware of these conditions, but he is aware of the fact that the truck cost of upkeep is amazingly low, that tire cost is much lower than that of his neighbor, and that the all-round performance of the truck is superior to that of his rival business man.

This question was widely discussed at the recent meeting of the Society of Automobile Engineers, and the engineers from over a score of truck factories were unanimous in the opinion that truck motors are too high powered to-day. This has in many cases been due to the fact that several makers have taken a motor from a pleasure car and aimed at adapting it to a truck chassis. Where this policy has been followed the results have not been a success. The truck service is so different from the pleasure-car service that a different design of motor is needed. With a touring car the motor is working but a few hours of the day, and then rarely at anything like its limit of power. It is only for very short periods that the car is driven with the throttle open. On the other, the truck motor must operate for 10 hours every day for 6 days in the week and 52 weeks in the year. During these 10 hours it is working at nearly its full throttle position, at least at 75 per cent. opening, and very often more. This is a severe constant strain and calls for different features of design from that found in the pleasure car. It calls for extra large crankshafts, larger bearing surfaces and more bearing surface for the connecting rods.

President Donaldson, S. A. E., Eugene P. Batzell and W. P. Kennedy at Detroit S. A. E. Convention

Discuss Timely Motor Truck Problems

Mid-Summer Session of Society of Automobile Engineers Discusses Motor Sizes, Standard Wheels and Tires and Worm Drive

DETROIT, MICH., July 1.—The 3-day convention of the Society of Automobile Engineers held in this city and on steamboat between here and Mackinac Island, Thursday, Friday and Saturday of last week proved one of the greatest possible successes to those interested in the development of the motor truck. President Donaldson presided at all sessions and conducted the proceedings in a masterly fashion. While only a fraction of time and proceedings of the convention was devoted directly to the commercial vehicle field, yet the value of such papers and discussion was of inestimable worth to the truck manufacturer and truck user. The commercial vehicle end of the program consisted in reports on the wheel and tire standards and also two exhaustive papers, one on the proper design of motors to the trucks they are mounted in and the other on worm drive. Eugene E. Batzell's paper on "Motor Sizes and Drive Ratios for Commercial Vehicles" was one of the best treatises and provoked broad discussion. Another interesting paper was "Worm Gearing," by Frank Burgess. William P. Kennedy, chairman of the committee on truck standards and wheel dimensions and fastenings for truck tires, presented the reports of this committee. While the various discussions and reports on standardization do not directly apply solely to the commercial vehicle field, yet they are as closely connected to it as they are to the pleasure car field and standardization means more to the buyer of a motor truck than the buyer of a pleasure car.

Mr. Batzell in his paper on "Motor Sizes and Drive Ratios for Commercial Vehicles" brought out the point that in general truck motors are too large and proved this by citing examples of the varying sizes of machines at present on the market. The discussion on this paper brought out prominently the major fact that a truck motor must be more than a motor used in a pleasure car type with a lower gear ratio for transmitting to the rear axle. The truck motor must work continuously for 10 hours per day at its full capacity and consequently it must have stouter crankcase parts, larger crankshaft, larger bearing surfaces and slower piston speeds. So valuable and pertinent throughout was the discussion on this paper that it is reproduced in the following pages of THE COMMERCIAL VEHICLE and the first installment of the paper follows: The discussion precedes the paper, as it aids the reader in analyzing the motor problem in trucks and paves the way for the paper which appears on page 68.

Mr. Burgess's paper on "Worm Gearing" was of a highly technical nature and will be reproduced in a later issue.

Under the direction of Mr. Kennedy, the truck standards division is accumulating data of every possible nature relating to commercial vehicles, and this data will be available to all of the members of the society. The question of standardization in motor trucks is paramount. The committee wrote to wheel makers for trucks asking if they considered the work of the committee was aiming to standardize as practical; if it required modifications; if it had been an advantage to them, and if it had caused any complications in their work. The correspondence asked if the new standards were resulting in a saving of time and money, and also what percentage of their product was being manufactured according to S. A. E. standards. The replies showed that 90 per cent. of the makers are working to the S. A. E. standards and all new work is being laid out according to such.

In reporting on the truck-standard division, Chairman Kennedy said that the committee was collecting data on truck specifications from all sources. The class papers had published many data sheets on trucks at show time, but there is need for much more. It is necessary to have complete and accurate information before certain steps can be taken toward standardization of parts, as has been accomplished in the touring car field. Several makers have objected to furnishing all of the data on the ground that they imagined their details of construction would be given country-wide circulation and so get into the hands of their competitors. The chairman assured them that any data obtained would be treated with the utmost confidence by the committee, much the same as stock-car specifications have been handled by the technical committee of the American Automobile Association.

The paper by Chairman Henry Souther of the Standards committee was one of the masterpieces of the convention, in that it presented the true meaning of the standardization movement which the Society has been fostering for the last few years. Among some truck manufacturers there has been more or less criticism of the standardization work, these makers having the false impression that standardization hinders inventive genius and individual progress on the part of designers and manufacturers. He suggested the use of the words "Recommended Practice" instead of the word "Standard," as this might prevent the engendering of false impressions. Standardization or recommended practice is voluntary and not compulsory and is not intended to usurp the engineer's position, but to facilitate his work. The standard represents the collective knowledge of all concerned rather than the narrow viewpoint of one engineer. Referring to the work of the standards committee in the truck field Mr. Souther said: "The truck standards division will attempt to recommend standards for a new industry as fast as it can arrive at definite conclusions. At any rate, it is accumulating all the data possible relating to trucks, and these data will be immediately available and result in sufficient knowledge to enable us to recommend any reasonable standards that may be called for.

"How much can be standardized and how rapidly the work can be done remains to be seen. The division is on duty with the purpose of advancing as rapidly as seems safe. It would seem that if axle builders can attempt to standardize their output at this time, the engineers who will purchase and use the axles ought certainly to have a hand in the effort. The axle manufacturers express their willingness at this time to modify their designs in deference to the ideas of the engineers. But if the matter is delayed too long they will not be so willing, and the inevitable result will be friction between consumers and producers.

"The work of the wheel dimensions and fastenings for tires division has been startling in its success. The situation was apparently an impossible one when the division took up its labors. There were a dozen or more makes of tires and styles of tires, and for every nominal size there was a different actual size. The differences were small but important in the mind of each of the manufacturers of the tires. The conditions existing in the truck factories were intolerable. It was common for a truck manufacturer to have from five to fifteen trucks standing ready for delivery with the exception of wheels and tires. Special wheels had to be ordered and the order depended absolutely upon the tire specification. There was no possibility of stocking with either the wood wheels or the tires.

"Demands reached the division from all sides—particularly from the manufacturers of trucks—asking that something be done. The work has been done and the result is already perceptible. The tire people are satisfied, the wood wheel people are satisfied, and the manufacturers and producers of trucks particularly are satisfied. Certain small details are still under consideration, but so many of the important details have been handled successfully that the former now seem small and insignificant to all concerned."

In corroboration of the outline of work by the standards committee Chairman Kennedy, of the truck wheel and tire committee said:

"I want to corroborate President Donaldson as to proper truck speeds, as the truck committee has not made any recommendations on this question. The committee on wheel dimensions and tire fastenings for trucks has nothing to do on tire sizes. Our work was to standardize wheels and our recommendations ended with a definite idea on felloe bands as recommended by wheel makers. Before our recommendations wheel makers had to carry in stock months before they got their orders vast quantities of materials amounting to many thousands of dollars, but with the standardizing of sizes this money was put into other uses. To-day nearly all of the tire makers for commercial motor vehicles are working to S. A. E. standards."

C. T. Meyers, General Motors Company.—I have had to do only with truck construction and in nearly every case we have adopted or arranged to adopt S. A. E. standards and in all new designs we are laying down we are working to S. A. E. standards. It is very important in truck manufacture to use standard parts as spare parts must be carried in stock in the branch houses and agencies all over the country.

L. S. Boers, Schwarz Wheel Company.—I speak as a wheel maker. We are vitally concerned in the development of these standards. Before the adoption of standard wheel dimensions for trucks it was impossible to make up any stock for customers as nothing could be done until the customer's specifications were in. Since the adoption of the wheel standards we can make up felloes long in advance and can also carry truck wheel bands and so are in a position to give quick delivery. The standards mean economy to maker and owner. In my opinion the tire makers should all come in future to making standard sized truck tires and we should all follow after them.

J. A. Steinmetz, Janney, Steinmetz & Company.—We make seamless steel gasoline tanks and standardization aids very much. We make standard diameter tanks and a change of 1-16 inch in diameter from these standards costs the automobile maker perhaps $1,500 to $2,000 a year. We require dies for our work and the more dies the more cost. Within the last two years we have changed 50 car makers over to standard sizes and saved each over $3,000 per year. We now use also the standard iron pipe size of tank fillers and caps.

Members of Society of Automobile Engineers Assembled in Detroit

Motor Sizes and Ratios for Trucks

This paper on "Motor Sizes and Drive Ratios for Commercial Cars" was based by me chiefly on the fact that at the present state of commercial car development we have motor sizes with a variation in some cases of about 50 per cent. in piston displacement. Consequently my idea was that if the same amount of work has to be performed in motors of such differing sizes, there was somewhere an excessive loss. Either it is that such motors of large size do not do the work they are called upon to do in accordance with their size, or that they are working under low efficiency, because we know that they do not work to their capacity.

The fuel consumption of these large motors is very great, and consequently the user of the motor truck is paying excessive bills for gasoline, and also for his oil. The fact is that many pleasure car makers are going into the truck field, and use pleasure car motors in their trucks, without paying attention or consideration to the size of the truck and the motor. I have tried to explain the points which I think should be covered, the matter of economy and efficiency, and the proper motor size which would be sufficient to put in a motor truck of an assumed capacity.

In my paper I took the 3-ton truck for basic calculation, and found that a motor size of about 3½ by 5½ inches bore and stroke for a four-cylinder four-cycle type is sufficient, if the service of the truck is not under extremely severe conditions. Besides, I found also that a motor of this small size, which will probably be considered by many extremely small for that truck, does this work only from the very easiest runs up to normal runs on high gear, with throttle not fully open. With normal load this truck can work with full throttle, and consequently under the best conditions for motor efficiency and least fuel consumption.—E. P. BATZELL.

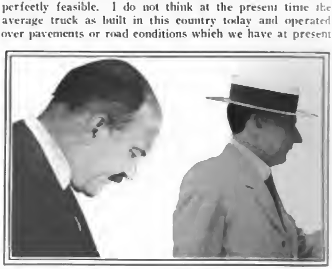
E. P. Batzell Analyzes His Paper and Opens Discussion on Too Large Motors for Trucks

C. T. MYERS, General Motor Truck Co.—I think that the views expressed by this paper ought to occupy the attention of any one who has under his charge the designing or the construction of a truck. I believe that at the present time the motors in trucks in this country are far too large for the service they are called upon to do. It is my opinion, based on observation of a great many trucks, that the motors are largely motors converted from pleasure-car practice. They are not ordinarily called upon to deliver their maximum torque; in fact, they deliver far less than their maximum torque under almost all conditions. It is perfectly possible to design a motor of less cylinder capacity than the average today. The crankshaft will have to be heavier, the bearings designed a little more carefully and other things looked after, but I think it will be possible at least to decrease by 33 1/3 per cent. the volumetric displacement of the average motor in a truck today.

I can give you a little idea, perhaps, of what can be done by a small motor. The smallest size mentioned in Mr. Batzell's paper is 3 by 4½, which he proposed to use in a 3-ton truck. I do not believe that we would be safe in putting so small a motor into a 3-ton truck for use by American drivers over American roads, especially at the present time, with the limitations which our gearsets place upon us. I can say, however, that a motor of that size has been placed in a truck of the capacity of 1.5 tons, which actually has been carrying 2 tons and some times a little over. We have had no difficulty in having that truck operate over average bad city pavements and up 3 per cent. grade on higher gear, with a reduction to the rear wheels of something over 6 to 1. That would indicate it, I think, if you will analyze it, because all this thing comes down to a question of torque, available torque from the motor delivered to the rear wheels in the form of tractive effort—that will fall far below the practice in this country today.

After making some experiments with one of our heavier trucks, a 3.5-ton truck, which was formerly equipped with a 5 by 5 motor, we displaced that motor and installed a 4½ by 4½ motor, and carrying 3.5 tons we negotiated grades of 3½ to 4 per cent. on the high gear, with a reduction of about 6.66 to 1. I am sorry that I have not the data with me in such form as would make that comparison. I hope to get some of that in shape before very long and would be glad to give you a comparison, a direct comparison of quite a few trucks made in this country today, showing the wide variation and showing, as I think I can, from actual experiments which we have been carrying on, that the motor is very seldom called upon to deliver anywhere near its maximum torque. It is, therefore, burdening the truck with its weight, which is dead weight; it is burdening the purchaser with the expense, and it is burdening the purchaser with the additional fuel consumption. I think there is a vast amount of work to be done on this subject, especially in connection with the gearset design. We are far too prone, I think, to follow the American demand for power in a pleasure car when we turn this motor over to ask it to do work for a truck.

The question of speeds of motor trucks was brought in in a casual way this morning. Under a great many conditions the speed of 13 miles per hour, mentioned this morning, is perfectly feasible. I do not think at the present time the average truck as built in this country today and operated over pavements or road conditions which we have at present



Chairman Henry Souther and Howard Coffin, Both Discusses Truck Matters at S. A. E.

in this country or operated by the drivers, the average drivers now at work in this country is an advisable thing. It is perfectly possible to do it. There is no question about that. We have practically cut down the speed of our 5-ton truck to 9 or 9.5 miles per hour loaded. It would run a little faster light. Taking those things under consideration, it is perfectly possible to design a truck with a much smaller motor and have it do just as satisfactory work with far better results to the purchaser and at a less cost to manufacturer.

David Fergusson, Pierce-Arrow Motor Car Co.—It goes without question that the motor should be made as small as possible to do the work, but in a truck motor it is supposed to run at a constant speed, and the vehicle is supposed to make a certain number of miles per hour, and it is a very easy matter to find out the ratio of gear necessary to produce that, and if you have made one successful vehicle of any size truck, it is very easy to get a basis for any other sizes from it. In gas engine practice for stationary engine purposes, I do not think that it is advisable to load up that engine where it is doing a constant load for 10 hours a day, to within more than about 75 per cent. of its capacity. If you try to work it to its full capacity, you will spoil your engine. You should always be well within its capacity. I do not think any gas engine manufacturer would advise putting in an engine to work more than 75 per cent. of its capacity, if it is going to work 10 hours continuously and expect it to work 10 years. If you try it and expect it to work to its full capacity, it will have a very short life.

In truck work experience is the main factor. We have built a 5-ton truck. We have had very great experience with it now, with 200 of them sold. We have come to the conclusion that we have got about the right power for that size truck. We have got a four-cylinder engine, 4⅞ by 6. We know from experience that it is giving splendid results; that it has got a certain gear ratio; it gives you a certain tractive effort, and if you divide the tractive effort by the weight of the vehicle and the load you get a certain ratio—you get so much tractive effort for so many hundred pounds weight of vehicle and load. If we want to make a 2-ton truck, all we have got to do is to get our same tractive effort in proportion to the weight of the vehicle and load. We assume a certain speed of the engine may be 1,000 revolutions per minute; a certain speed which will be greater for the lesser load; probably 12 or 13 miles an hour for the 5-ton truck; probably 15 for the 3-ton truck; probably 18 miles an hour for the 2-ton truck. Having all the data available, it is a very easy matter to get a motor that will be proportionate. Divide the weight by the tractive effort and that will give you a certain figure of so many pounds tractive force per 100 pounds of weight of vehicle and load, and having got one successful vehicle to go by, it is a very simple matter to make all your other sized vehicles proportionately, and I feel confident that there will be no mistake made on the under-sized motor or over-sized motor. The only thing for any one starting out is to get the data from one successful vehicle. Having got that data, it is a very easy matter. You may get ten sizes and every one will be based on the right proportions if you work along those lines. I think it is a big mistake to put too small an engine in a given vehicle. It will have to be worked to its full capacity to a great extent. It will not live in the commercial business. In the commercial vehicle end of it, an engine is supposed to last 10 years. In the pleasure end of it it is not so important: but in the commercial end of it it is extremely important that the whole truck shall have very little cost in maintenance, and it should have a long life. I think the size of the motor is very easily gotten at if you can go back to some successful vehicle and base your other sizes on that.

Designer David Fergusson and Consulting Engineer E. T. Birdsall, Both Active in Truck Engineering

B. B. Bachman, The Autocar Co.—I was very much interested in reading Mr. Batzell's paper on the relative size of motors and the proper gear ratio for commercial vehicles. I have been connected with our company ever since the inception of the commercial car in its line and have been very closely connected with all the details of the designing of that car. We have quite a number of the 3.5-ton trucks on the market in use for quite a considerable period, and while I was not able to thoroughly digest all the remarks, or all the data presented in Mr. Batzell's paper, I feel that he has offered the basis for some very valuable lines of thought in connection with commercial car practice. In the actual experience of cars working that we have had, and in certain demonstrations and tests which have been conducted at our plant, I am inclined to agree heartily with all of Mr. Batzell's statements and also with the statements of Messrs. Myers and Fergusson. The correct size of the motor for a commercial vehicle is one which requires a good deal more attention and care than in the pleasure car. The American idea of pleasure-car service is a variable one, differing according to the amount of money a man pays for a car, whether he wants a very high-speed proposition or one which he uses for family work, or for conservative work in the nature of business, and so forth. In the commercial car field it is a problem of transporting materials. It becomes a transportation problem purely, and therefore the various elements of the car have to be so proportioned as to transport that material at the lowest possible cost for maintenance, and for fuel and for the various other items which enter into that much-discussed phase of the situation. Anyone who has been in the commercial business and has made a study of the various models on exhibition at the different shows during the past year could not help but be struck by the thought that Mr. Batzell presents: the varying size of motors for cars of a given carrying capacity and also the different ratios employed in the transmission of the power from the motor to the wheels. It is an evidence of the fact that the industry is still young and that engineering experience has not had a chance to become crystallized into that which is the best and which is the most practical. I feel that in some designs which are on the market and which have been proposed, the motor sizes are entirely too large in connection with the strength of the transmission elements. In other cases, the reverse is true. If a man designs a car for carrying any load and he puts in a motor which is capable of taking that car and that load over any of the varying conditions of road surface and grades which we

Charles E. Duryea and Frank Burgess at S. A. E. Convention

find in traversing this country from the eastern seaboard to the western, I believe that he is making as much of a mistake as if one of our railroad trunk lines were to attempt to adopt the same type of locomotive for hauling its trains over the Central Plains as it uses to carry them over the Rocky Mountains; and, therefore, there is no question but that the considerations which must first be brought into a definite form are the loads to be carried, the territory in which the cars are to be operated, and then to proportion the motor and the transmission mechanism in such a way that the goods can be transported in an economical manner with the least expense. That presupposes a motor such as Mr. Batzell describes, of the lowest possible power to do that quantity of work and of a transmission mechanism so designed in ratio and in strength as to transmit the power developed by the motor at the highest efficiency for the longest period of time.

W. C. Guilder.—I am in favor of slow speeds for trucks. I have found that out in my experience. Cut the speed down, get a motor of ample power and the life of the machine will be much longer.

C. E. Duryea, C. E. Duryea Co.—I have had a very limited experience in the commercial line. I have built an occasional delivery wagon since 1895. The remarks of the last speaker seem to be quite to the point that we should keep the speed of the motor down so that we do not get a short life. The only point I wish to bring out in connection with that is the designing of the motor so that it will deliver a high torque at a low turn of speed. Most engine designers pay too much attention, I think, to the maximum results shown on the testing stand and not so much attention as they should to getting high power at a low speed, say 600 revolutions per minute, or 800 revolutions per minute. In other words, the point I am trying to bring out is the difference between a race horse and a draft horse. Most of us rate our motors as if they were race horses. They are not. They are draft horses. They should be like an old mule. They should get down and squat like a mule when he gets in the mud and they should pull and pull, at low speeds. Right there gives me a chance to say something about the two-cycle motor. They pull better, I believe, than a four-cycle motor. The two-cycle motor fills its crankcase—its cylinder full of compression charge and pulling well; better than a four-cycle, I believe. That is one reason why I believe in the future of the motor for actual daily service; not for racing conditions and not for vehicles that are driven at high speeds, but for the common everyday use where you want something that will pull you through the sand and mud and snow, the two-cycle motor seems to have advantages over the four because it does that very thing. You cannot get so much at high speeds, but you can get more proportionately at the lower speeds.

J. G. Perrin, Lozier Motor Co.—I should like to bring out the point regarding the relation of tire life to speed. No doubt but motors could be made to drive the trucks at the highest speed, but I think the tires limit that point.

E. T. Birdsall, Consulting Engineer.—About all I can say is that I agree with Mr. Batzell. My experience with the truck problem is fairly limited, but I believe in the small-bore, high-speed motor, with the crankcase and bearing surfaces of proper design. For example, if we have a 3.75 by 6-inch motor in a 3-ton truck the crankshaft, crankcase and all the bearings ought to be about the same as you would use in a 5.5-inch bore motor. With regard to the speeds of the trucks, it all depends on what you are willing to pay for tires. I came across a user of trucks some time ago. He had a 2-ton truck that he was carrying 4.5 tons on. He had put in auxiliary springs. He was carrying 4.5 tons, as I said. I thought I was informing him that he was ruining his truck. He said he knew it, but he was gaining more by the extra load that he carried on that truck than the cost of a new truck, he said, and he proposed to use it a year or 18 months, and buy a new one, and use the second one the very same way. He said he had figured it out to his own satisfaction and that was the cheapest way. He did not show me figures, and I do not believe he had figured it out. But as far as I have gone in the truck business that is about my view of the proposition: the small motor, say 3.75 by 5.5 or 3.75 by 6, on a 3-ton truck should be run at high speed, probably 1,200 all the time; but have the rest of the motor, have the balance of the design, as if you had a great big motor. In fact, I have one on the boards now. I am using all the parts of a 45-horsepower engine on a 3.75-inch bore motor. The speeds as recommended by the N. A. A. M. are pretty near the right thing. I do not believe you can drive a 5-ton truck over the pavements that we have in our cities and keep your tire costs down if you run over 9 miles an hour.

H. E. Coffin, Hudson Motor Car Co.—At the foundation of this entire question is a problem which has to do with neither piston diameter or motor dimension in any way, and that is the problem of piston speed, linear speed per minute, which is the proper speed for cast iron to work against cast iron with lubricants such as we know, and stand up for 10 hours a day, for 300 days in the year. I think a great many years, 50 or 75 years, of big power plant work has pretty well fixed the piston speeds for that industry. I do not know why we should throw all this experience to the wind in starting in to build motors for truck work. It seems to be that the character of the service is almost identical, unless we start on the assumption that a man is willing to use or abuse a truck motor for a few months and throw it away and put in another. If he can do that and make money on the proposition, why then, of course, my reasoning is unsound. If he cannot do that, any more than he can replace an electric generating outfit, or rather a motor for driving such an outfit, then it seems to me that our basis for design in the case of a truck motor should be the same basis as is used for the design of the big engines such as we have been building for 50 years.

Henry Souther, Consulting Engineer.—Mr. Birdsall hit it pretty hard and began to make me think he had gotten away with all my thunder, and that is the weight of the truck motor compared with the weight of the pleasure car motor. I think it is well known to those who started in the industry early that we began too light altogether for pleasure cars. We have worked up through that period until motors are all right for pleasure cars. They run as long as they should, as many hours per day as they should, and so on. Flying machine engines are in the same condition. They are too light for the work. They will not run continuously. That has been proven again and again. Every flyer will testify that his motor will not run as long as he would like to have it.

Now, then, we have come to a third stage of development, the truck engine. It must run more hours and more steadily with a more uniform torque, probably, than any pleasure car runs. Now, why not meet those conditions as they have been met in the past for electric light plants and every other plant, mine hoisting engines, if you like, air compressors, and make the parts very much larger and heavier and even of better materials than we do in the pleasure car motor? It seems to me only logical, and I feel sure that that principle employed, the principle that Mr. Coffin brought out, of relatively low piston speed, will give a truck engine endurance that will be worth while. That is the phase I wanted to bring out.

R. W. A. **Brewer**, London, Eng.—With regard to the use of truck motors in England we started on a size which we found, to our cost, was much too small, and I believe you will find that the general practice with trucks of 3 to 5 tons capacity is to put in a motor of not less than 4 inches cylinder bore. Now, Mr. Birdsall rather hinted at a point which I want to emphasize more fully and that is that the cylinders are not the fundamental point from which you must carry out the design of a heavy truck. If your cylinder dimensions are 4 inches, that does not say that the rest of the construction of either the engine or the machine itself has to be in accordance with a 4-inch cylinder bore, because we find that the greatest depreciation and wear which takes place in our trucks, which run for long hours, 20 hours per day, every day, 7 days a week, does not take place so much in the engine itself as in the smaller parts, and in the transmission. By the smaller parts I mean every rod and bolt in the brake gear and change speed gear, and so on, and it is the wear and tear that takes place in these parts, which is very much greater than any engine trouble, to which we give serious consideration.

Now, in the paper I wish to call attention to something that I do not quite follow. I must say that I have not read the paper as thoroughly as I should have done; but it appears that the author goes out to base his deductions on minimum fuel consumption. I am not quite sure I am right, but there are some curves given which show a drooping curve of fuel consumption, and the author states that from the lowest point of that curve he sets out to design a motor to carry out certain work. In the first place, I do not know why that curve should droop at all. It may be something in the design of the particular motor, which undoubtedly would show a drooping power curve; but the contour of that curve is rather strange to me, for a modern engine. In the second place, he says: "Pleasure cars, being driven at slow speed mostly with small throttle opening," etc., and goes on from that to deduce what the compression ratio should be; and, furthermore, there is some point made as to thermal losses and a comparative statement of gain and loss between the loss to the water jacket and the friction of the working parts.

I think that when you set out to design a commercial motor there is very little relation that is of any use to the designer at all between the loss of heat to the waterjacket and the friction of the working parts, because you will find, in general practice—at least we find it—that if you get a certain loss to the waterjackets, your total losses being practically the same, your exhaust losses are less when the jacket losses are increased, in a well-designed motor, so that losses of heat to the waterjacket apparently do not come in at all, except with regard to heating up the radiator. In regard to the gain one can attain by making certain modifications to the design, there is no doubt that such gain may be considerable, and that the frictional losses which are entailed in gaining a certain end are out of the consideration altogether. They do not come into any material account.

With regard to the limitation of the compression ratio, I would say this, that a commercial motor, as I have already mentioned, runs for many consecutive hours and it gets very little attention. I would advise, in the designing of a motor of that class the very highest possible compression should be allowed for when the motor is new, because in running there are always leakages past piston rings and elsewhere.

E. P. **Batzell** said in closing the discussion:—In regard to the work of commercial car motors and the life of those motors it is certainly obvious that the commercial car motor that has to be designed for service cannot be designed on the regular basis of a conventional automobile engine, but it is rather to be following the lines of a high-duty or high-service engine, as you might call it. As Mr. Coffin said, a low piston speed, a different design of crankshaft, with large bearings, proportionately large piston surface, and so on. It certainly would be a mistake to design such an engine with large cylinder space, which means piston displacement, just for the sake of gaining large wearing surface in other parts. It would be well to increase the moving parts and still keep the small piston displacement, so as to get additional economy of the engine action and also long life.

As far as the last remarks made about the drooping shape of fuel consumption curves, everybody knows who has made tests of motors, that fuel consumption has a minimum at certain speed and for economy we should start out from this moment to adopt the normal speed of the motor. For instance, in the tests which I am introducing here, the minimum fuel consumption takes place somewhere around 1,000 feet per minute of piston speed; this is not such a low speed as would characterize running the motor at very slow revolutions, but it corresponds exactly to a medium number of revolutions per minute, which would be favorable for both the piston speed and small bore. This will permit getting away from heavy, bulky motors.

As far as the way I figure out compression space, it is certainly so that in a truck we have to have more volume of compression space than in a pleasure car, the pleasure car being run under full throttle seldom and for short times.

Harold L. Pope and R. W. A. Brewer, Who Discussed Truck Topics

News of the Month Re Motor Trucks

Hot Weather Hastens Orders for Electric Vehicles—New Motor Truck Manufacturing Concerns—International Fire Association—Motor Truck Company Sued by Builder—Wilmington Traffic Regulations—New Gasoline Manufacturer

The Stewart Motor Corporation

T. R. Lippard and R. G. Stewart, vice-president and general manager and secretary and chief engineer, respectively, of the Lippard-Stewart Motor Car Co., 1738 Elmwood avenue, Buffalo, N. Y., withdrew from that organization June 1 and have formed and financed the Stewart Motor Corporation, which will enter the motor truck field. Mr. Lippard is president and general manager and Mr. Stewart vice-president and chief engineer of the new concern. R. P. Lentz, for several years connected with the London & Lancashire Fire Insurance Co., is secretary and treasurer, and Robert W. Ingersoll, recent manager of the Firestone Tire & Rubber Co. in Buffalo, will be sales manager.

The older company will continue operations in its plant on Elmwood avenue under the direction of August Becker, president, and E. J. Barcalo, treasurer, who have obtained full control through the withdrawal of Messrs. Lippard and Stewart.

The new company has secured the plant recently vacated by the Niagara Machine & Tool Works at the corner of Randall and Superior streets. It will be put into condition for occupancy immediately. Orders for machinery, equipment, etc., are now being placed from the temporary offices of the company at 1056 Ellicott Square. Every possible effort is being made to start manufacture at the earliest possible moment, so as to fill orders already secured for early fall delivery.

The company will manufacture light-capacity motor trucks at a moderate price. The new product will be known as the Stewart truck, being named after Mr. Stewart.

Messrs. Lippard and Stewart were connected with the Franklin company of Syracuse for several years. They came to Buffalo about 1½ years ago to start the Lippard-Stewart company, whose cars are now being operated in many cities.

Electric Truck Sales During the Month

The recent hot weather, while it has not materially increased the sale of electric commercial vehicles, has hurried a large number of prospective buyers into placing their orders owing to the high death rate of delivery horses in the warm weather.

The Atlantic Vehicle Co. has received a number of inquiries during the past month from the smaller concerns and individuals whose requirements cover not more than one to five vehicles. Although at this season there seems to be a lull in the demand from the larger transportation companies, wholesale houses, brewers, etc., the outlook is very bright, and this company looks forward to placing some large orders in the near future.

During the past month the Waverley company has sold ten more light delivery wagons to the Fleischmann Yeast Co. three 2-ton trucks to the American Express Co. and seven light delivery wagons to L. S. Ayres & Co., Indianapolis.

Sales reported by the Walker Vehicle Co. for the period between June 15 and July 15 are one of thirteen wagons of the 1000-pound parcel delivery type to Marshall Field & Co., which gives the latter company a total of forty-one Walkers now in use; a delivery of ten vehicles of the same type to Mandel Bros., Chicago, and the completion of a delivery of eleven trucks to Carson, Pirie, Scott & Co., Chicago. The last mentioned order consisted of seven vehicles of the 4,000-pound size and four of the 1000-pound capacity.

The Baker Motor Vehicle Co.'s business, which has been excellent for the past month, has consisted mostly of repeat orders, especially from express companies.

More inquiries have come to the Couple Gear Freight Wheel Co. during the past 60 days than a like period has ever before brought forth. They are at present working on one order of ten, one of fifteen and one of three machines. The trade seems to be about equally divided between the battery-driven and the gas-electric.

The R-C-H Corp., Detroit, has temporarily discontinued the manufacture of electric commercial vehicles.

The business of the Anderson company has not been marked by any sales of vehicles in large numbers to any one customer during the period from June 15 to July 15, but some very interesting small shipments have been made, notably the Washington, D. C., emergency hospital ambulance, of which there is an accompanying illustration. Other sales have been to the Walker-Gordon Laboratory, also of Washington, and a bus to McLaren's Hotel at Winnipeg, Man.

New Pittsburgh Motor Truck Co.

Pittsburgh, Pa., has a new motor truck manufacturing concern known as the Duquesne Motor Car Co., which has been secured for this city by the Pittsburgh Industrial Development Commission. The company is a corporation and is financed by six wealthy Pittsburghers. It has a capital of $25,000 at the start, which will increase later to $250,000. The company will employ 250 men. It has leased 60,000 square feet of floor space at Thirtieth and Liberty streets where it has combination switching rights with the B. & O. and the Pennsylvania railroads. The first year's output will be entirely pleasure cars, probably about 500. The company, however, will arrange from the start to manufacture a line of commercial cars and will use the Wisconsin engine. It will procure practically all its raw material in Pittsburgh, and the cheapness of this, by the way, in accordance with what it would have to pay on a long freight rate, was the impelling motive for its locating its plant in the Smoky City. The company has secured an option on 168 feet of Liberty street frontage adjoining.

The officers are W. L. Rodgers, president of the Pittsburgh Gage & Supply Co., president; R. F. Ramsey, treasurer; Frank H. Moore, who developed the Kissel Kar, engineer, and Oscar J. Howick, former designer of the Lozier car, designer.

International Association of Fire Engineers

The International Association of Fire Engineers will hold its fortieth annual meeting in Denver, Col., September 17, 18, 19 and 20. A large attendance of chiefs from United States and Canada is expected. The program and topics for discussion include the following:

Fire Prevention and Building Inspection by Members of

Fire Departments.—Fred Brodbeck, chief, Salina, Kan., and A. M. Schoen, manager S. E. Underwriters' Association, Atlanta, Ga.

The Triple-Combination Hose Wagon, Chemical and Pumping Engine. Is It a Success?—F. J. Connery, chief, New Castle, Pa.

The Proper Location of Sprinkler Tanks, Should They Be Located on Roofs, Fire Walls or Separate Towers?—J. A. Tremblay, chief, Montreal, Can.

Tractors for Steam Fire Engines, Aerial Trucks and Water Towers.—John Kenlon, chief, New York, and R. H. Bawker, chief, Passaic, N. J.

The Care of Fire Hydrants to Prevent Freezing and the Best Way to Thaw Out Frozen Fire Hydrants.—C. W. Ringer, chief, Minneapolis, Minn., and John Aiken, chief, London, Ont.

Direct Connection from City Water Mains to Sprinkler Systems and Stand Pipes.—F. A. Raymond, engineer National Board Fire Underwriters, New York.

Motor vs. Horse-Drawn Apparatus in Heavy Snows.—James Smart, chief, Calgary, Can.

The Efficiency of the Motor Pumping Engine.—Geo. W. Boothe, chief engineer National Board Fire Underwriters, New York.

A Review of the Association Work for the Past 10 Years.—Howard L. Staunton, chief, Norwich, Conn.

Pitt Motor Succeeds Lion Motor Truck Co.

The Pitt Motor Car Company, Pittsburgh, Pa., has been organized to succeed the Lion Motor Truck Company and has taken over the plant of the latter in that city. The Lion company was sold at a bankrupt sale in May and the Pitt people took over the plant and other assets of the business. The officers of the Pitt company are E. P. Douglas, who was manager of the Lion company, president and general manager; J. E. Douglas, treasurer, and W. F. Philips, secretary. The company is now making 1-ton and a few 2-ton trucks. It will shortly start the manufacture of delivery wagons of 1000 and 1500 pounds capacity.

Suit Against the Mais Motor Truck Co.

Franklin Vonnegut has been appointed receiver for the Mais Motor Truck Co., on a suit brought into the superior court by Edwin King, a contracting builder who built a factory at a cost of $5050 for the company. Payment of only $2800 has been received by the builder, and a suit was brought to protect a mechanic's lien against the property. It is alleged by King that the company, although not at present actually insolvent, is in almost immediate danger of being so.

10 Electrics Replace 14 Horses.

United Electric Light Co., Springfield, Mass., has determined to eliminate all of its horse-drawn vehicles and substitute in their place motor-driven trucks. Ten of the latter will be purchased, taking the place of 14 horses. This course has been adopted because of the admirable service which has been rendered during the past year by three trucks already in the possession of the company. A large private garage will be constructed to house the trucks, which weigh from 1 to 5 tons, all of them being electrics. It is hoped that the service will be in operation during the present month.

Unique Traffic Regulation in Wilmington.

A traffic condition has developed in Wilmington, Delaware, a city of about 100,000 population, which is most unusual, the city authorities having found it necessary to restrict the traffic to northbound 2 days in the week, from 7 o'clock in the morning to 2 in the afternoon, on 2 parallel streets, half a mile apart, the lengh of street affected in each instance being about half a mile—a trifle over that in one case. The market place has developed to such extent, notwithstanding the fact that there are three large market houses, that it has for some time been encroaching seriously on the traffic in the main business thoroughfares, due to the fact that general business has been drawn thereto.

As a result of this condition the city authorities adopted an amendment to the traffic regulations—effective from July—which prohibits southbound traffic in the market section of each of those streets between the hours of 7 a. m. and 2 p. m. on the market days. In one of these streets—King—there is the main artery of one of the local trolley systems, but for some years the traffic thereon has been exclusively northbound. Because of the congestion of business in King street—though it is 60 feet in width—the company operating there was not allowed to have a double track, and as a result its southbound traffic is maintained on other nearby streets.

The Gramm-Bernstein Company.

The new Gramm-Bernstein Co. is a very close corporation, the capital stock being $500,000, $300,000 common and $200,000 preferred. The common stock is held jointly by M. Bernstein, manufacturer, Lima, Ohio, and by B. A. Gramm. F. Biszantz, also having an interest, will act as factory manager. A plant has been purchased and is being added to, which will give a total of about 125,000 sq. ft. of floor space. The plant is all one story, steel constructed, with the most modern lighting system. Everything is light and airy and sanitary. The plant is located on the main line of the Pennsylvania and D., T. & I. tracks.

New Roads in Pennsylvania.

A big step was taken by the Pennsylvania State Legislature to improve the road system of that state recently by appropriating $3,000,000 for this purpose and providing for 8000 miles of new roads spreading throughout the state. This action is due greatly to the persistent work of J. H. Weeks, of the Pennsylvania Motor Federation, and to the state body of the American Automobile Association.

Instrument for Cutting Down Reckless Driving Dangers.

A new instrument has been invented by which it can be told how many stops have been made, where and at what time they have been made and at what speed the car has been driven at different intervals during an entire day. It is supposed to cut down the dangers from reckless driving and to prevent unnecessary loss of time by drivers. The invention is under the control of the National Delivery Supervision Company, with offices in Philadelphia.

An Entry Into the Gasoline Field.

The General Vehicle Co., Long Island City, N. Y., is making an entry into the gasoline truck field. President P. D. Wagoner has issued a statement regarding the acquisition of the American rights of the Mercedes gasoline trucks, manufactured by the Daimler Moteren Gesellschaft, of Germany. A distinct difference is made therein between the fields of the gasoline and electric trucks. After very careful investigation it has been judged that the Mercedes truck is best fitted in the world for long haul work in America.

The American built Mercedes truck will be of exactly the same construction as the German model, and will be manufactured from the original drawings, tools, material and fixtures, being supplied by the Daimler people.

The following size trucks will be built: 1-ton, 2-ton, 3-ton, 5-ton, 6-ton and 7-ton, and their manufacture will begin directly the new plant, which is under course of construction, is ready. This will be equipped and built so as to turn out from 2 to 3 trucks per day. Meanwhile, Mercedes trucks are being imported until the new plant is ready.

Trade Conditions During June and July

Big Increase in Truck Business in Pittsburgh and Contiguous Territory—Official Washington Displays Special Activity—Presidential Year Affects Several Centers

THE following reports from Commercial Vehicle correspondents in many cities for the period of June 15 to July 15 show a steady demand with big increases in certain centers. Truck business in Iowa is specially brisk. Minneapolis and St. Paul are suffering as buyers are awaiting the garnering of the crops. In Baltimore and adjacent territory big gains have been made.

CHICAGO, ILL.—Sales in Chicago and the immediate territory are very satisfactory. A considerable number of large sales has been made and buyers of single vehicles are appearing in very good numbers. Owing to the increases in business of every kind, much of which was not fully expected, many concerns have bought trucks and light delivery cars sooner than was looked for, and in some instances difficulty has been experienced in getting deliveries. The effect of the February show is still apparent, and many firms that made decisions at that time but have been postponing action are now actively in the market.

The sales of light cars are in the majority, as their usefulness and economy are more and more realized. An increasing number of sales are reported to country districts, this department of the business being very active. The usual tendency of a Presidential year to retard business is not in evidence, and no sales are being held up on that account.

Car in Washington Postal Service

WASHINGTON, D. C.—The general report from the truck agencies is that the business in commercial cars has kept up remarkably well, considering the season. As stated before, Washington is abnormally quiet during the summer months, but in spite of that fact most agencies report twice as much business from the middle of June to the middle of July as was done during the corresponding period last year. The Flanders, Ford and Buick agencies report sales of four or five cars each during that time, with very bright prospects for October business.

Advance in prices by liverymen, who are now charging undertakers an increased price for hauling hearses and furnishing carriages at funerals, has caused the local undertakers' association, of which Isaac Birch is president and Alfred Gawler is secretary, to take up the matter of the advisability of dispensing with horses altogether and providing taxis instead of carriages and hearses run by gasoline. The officers are now investigating the subject.

The commercial car has proved so successful in the Post Office Department that Postmaster General Hitchcock and Postmaster Merrit have taken steps to increase the automobile collection and delivery service in the northeast and southeast sections of Washington. One machine has been placed in service at Station B on Capitol Hill. As a result of this three carriers and their mounts will be transferred to other sections of the city. The car will save the salaries of these three men and $105 a month in allowance for mounts. In carrying Station B carriers to their routes the machine will effect a further saving of $182 a year for carfare. The machine will be run sixteen hours a day. A White two-ton truck has been sold to the Government for use of the aviation corps of the United States army. The coast and geodetic survey of the Department of Commerce and Labor has purchased a White 1½-ton truck for use in its work on a four months' tour to North Dakota and Montana.

Good Fall Prospects in Pittsburgh

PITTSBURGH, PA.—The motor truck business in this city is flourishing. Sales, according to reports received from different agencies, average from 30 per cent to 50 per cent better than last year. One or two agencies report double last year's business. Not only is the number of buyers in the field much larger, but "repeat" orders are very general and are making a large amount of business for the local concerns. In the sales of heavy trucks the gains are not quite so marked as in the delivery wagons and lighter-weight trucks. These are especially good sellers this year. Department stores have been good buyers and also the laundry and catering business. The brewing concerns, most of which began to buy heavy trucks two or three years ago, are increasing their supply of these vehicles, and the transfer companies and the wholesale grocery houses have all been ordering big trucks. The situation so far this year is very satisfactory, much more so than for the general automobile interests, and the prospects for fall trade are, in the minds of nearly all dealers, the best for several years.

Baltimore Shows Excellent Prospects

BALTIMORE, MD.—There have been practically no changes in the sales conditions of motor trucks in this city and the territory covered by the local branch houses and agencies. The dealers say that they are holding their own and that they have splendid prospects for the fall and winter which time recently has proved the best for the disposal of cars in this section. What pleases the local dealers more than anything else is the fact that there is a big sentiment in favor of the trucks and that Baltimoreans and Marylanders, Virginians and West Virginians, are all deeply interested in the motor trucks. The dealers say they are positive of this from the way they are received by those to whom they call upon to explain the advantages of the different trucks they have to sell. The dealers say that with one or two exceptions they have never yet failed to get an audience and that in most cases the business men called upon will sit for hours and listen to the salesmen's explanation of the different parts of the trucks. True, not all these audiences have resulted in sales but the dealers declare that the big majority of them can be put down as excellent prospects. The street conditions still continue to prove a big factor in holding back many prospective purchasers, but with the new paving plan put into effect following the laying of the new sewerage system the dealers feel that they have an enormous field in this locality within the near future. There is no questioning the fact that truck-selling conditions for this period are away ahead of the same time of last year. The dealers say that the only thing to do with Baltimore business men is to keep plugging away at them and results are bound to be forthcoming, for these business men are always ready to sit up and take notice when they are convinced beyond a question of a doubt that the truck has considerably more advantages over the horse-drawn vehicles.

Twin City Truck Selling Is Low

MINNEAPOLIS, MINN.—Truck selling in territory tributary to the Twin Cities is in abeyance to a large extent. In 60 to 80 days, when the present crop is assured, dealers in the various truck lines expect a renewed start in the business. As a rule the manufacturers and dealers find little or no improvement in sales over those for the same period last year, the month ending July 15. If there is any increase it is mainly in the low-priced truck. The Wilcox Company and the Robinson-Loomis Company, principal manufacturers, find business merely on a level with last year. V. D. Wilcox, for the former company, says there is no great increase. The Robinson-Loomis Company report: "From 60 to 80 days, when the crop is in, will tell a different tale, when we expect an increase. People having not much ready money have been buying the cheap cars."

Best Selling Year in Des Moines

DES MOINES, IOWA.—Despite the fact that there is but one exclusive truck dealer in Des Moines, demand for the motor-driven wagons has been the best the past summer in the history of the business. One concern alone put out five 2-ton trucks in the past week and has several more on the way with buyers ready as soon as the trucks arrive. With this particular dealer selling conditions are the best now that they have been during any part of the present season, although the general opinion is that the demand is not quite as high as it was earlier in the season.

Manager Crawford of the Avery Company told a COMMERCIAL VEHICLE representative that its business was 20 per cent. better thus far in the season than that of the 1911 season.

Many of the heavy truck manufacturers are selling direct to buyers here and local dealers are not in on the sales. The demand for small delivery cars has been unusually strong during the entire season.

The city of Des Moines has just completed a deal for the use of a motor-driven combination police patrol and ambulance; the car will be rented at $300 a month, with the rental price applying on the sale price. Motor-driven fire engines also may be purchased during the present summer by the local fire department.

Columbus Lumber Dealers Buy Trucks

COLUMBUS, O.—The past month has been a rather active one in motor truck circles, both in Columbus and the smaller towns and cities in central Ohio. Sales agents have been quite successful in placing orders and deliveries of a number of trucks have been made during the month. One of the best features of the market is the fact that lumber dealers, material men and contractors are taking up the idea of using motor trucks in place of horse-drawn wagons. This is shown by the number of large trucks which have been purchased recently by material and lumber concerns. It has come to be known that trucks can be used in almost every contingency that horse-drawn wagons can be used to advantage.

There is also a good demand for the lighter styles of delivery wagons. Grocery firms, cleaning and dyeing houses, dry goods stores, bakeries and laundries are taking up the motor-propelled delivery wagon idea more and more. Dozens of sales of that character have been made in the Buckeye Capital recently. Taking it all in all the month of July was one of the best in the year so far for the sale of trucks and delivery wagons.

Actual Demonstrations in New Orleans

NEW ORLEANS, LA.—Two facts stand out prominently in the July business in commercial vehicles in this city: Actual demonstration has proven that 5-ton trucks can handle most classes of freight from the warehouse district to the docks at a less cost than the freight charges on the municipally owned belt railway; animal traction practically has been done away with in 3 commercial establishments having the largest city delivery organizations.

One of the boasts of New Orleans is the city's belt railway. It has capable management and the rates are as low as they can be made by an institution operated with the intention of earning no profit. Before this year, it never occurred to agents of motor trucks that there was a chance of getting a share of this business. Early this year, however, some of the enterprising agents began a classification of all moving tonnage in the city. They were surprised when they found that a very large percentage moved over the belt railway. With the faint hope that there might be a chance of handling this business cheaper, an investigation was begun. It was evident that the margin would be close, but there was a chance and actual tests were started. Three-ton trucks were used in the early trials, but it was found that it was only from warehouses or factories where street conditions were most favorable and where distances were short that any saving could be shown. This showing was sufficient to interest shippers, and tests this month with 5-ton trucks have shown a saving, often running as high as 10 per cent. The margin is sufficient to allow for rapid deterioration of trucks, which is certain to result in some of the hauls where considerable stretches of cobblestone have to be traversed.

In addition to saving the actual cash shippers save themselves the difficulties and delays that come in getting cars spotted and while switching is in progress. Moreover, during the cotton season there is always a car shortage when the belt management cannot furnish cars to handle goods to the boats. It often happens that at other times in the year there is a delay in getting car orders filled. When ships remain in port but a few days it is many times imperative that exporters get their stocks on board at once, all of which reasons aid the automobile salesmen in their work.

Bad side streets always have been a thorn in the side of the New Orleans commercial vehicle salesmen. Houses operating city delivery systems have been afraid to buy motor-driven delivery wagons, fearing that they could not negotiate the heavy mud on unpaved streets. Due to the heavy rainfall here, unpaved streets are in very bad shape most of the time. The mud is very sticky and some of the earlier and cheaper models of light trucks did not make a good showing off the asphalt. By directing the purchase of higher horsepower and by recommending higher grade cars, local agents have done successful evangelistic work. Dozens of tests have proven that motor cars can be driven through any street where mules can pull a wagon. The agents have gone the sceptics a point better and have overcome the mud masses through which the best mules have failed to get their wagons.

Demand for Light Trucks at Wilmington

WILMINGTON, DEL.—While inquiry among the local truck dealers did not develop any new agencies recently, it showed that the business is developing. Sales have been excellent for the past month and the inquiries indicate an even brighter outlook. According to most of the dealers, the chief demand appears to be for the lighter trucks, which is probably due to the fact that some sections of Wilmington are very hilly. No additional truck service departments have been established here for some time, most of the owners taking care of their own cars.

Weak Bridges, Unable to Sustain the Weight of the Truck and Its Load, Have Been Crossed by Means of Planks, As Indicated. The Second Picture Shows a Weak Bridge Being Strengthened by the Party, Which Had to be Done in Many Cases

Cross-Continent Trip

Alco Transcontinental Delivery Truck Has Overcome All Obstacles and is Now Two-thirds Way Across

FORT COLLINS, Col., July 25.—Special telegram.—Alco trans-continental truck arrived here this evening after a day's run of 66 miles. A very good run was made from Denver. The journey is now two-thirds accomplished. The total mileage covered to date amounts to 2,483, during a period of 29 days. The daily average run for the whole of the journey is 85 miles, the truck being 5 or 6 days behind schedule on account of the detours, bad roads, broken bridges. Fort Collins is in north Colorado near the Wyoming line.

THE enterprise of Charles W. Young & Co., Philadelphia, Pa., in despatching a consignment of soap by an Alco 3½-ton truck from Philadelphia to the Carlson Currier Co., Petaluma, Cal., is noteworthy in the history of delivery of goods by motor truck at long distances. The various obstacles of many different kinds which the truck has successfully overcome in the course of its adventurous journey through the States form a splendid tribute to the efficiency of a means of transportation that allows no difficulties to impede its progress. This journey will give evidence of the strength and vitality of a truck, the adaptability of the motor as a source of power in removing or overcoming obstacles, and the comparative ease with which a truck in the hands of capable drivers can tackle the roughest and most inaccessible roads and come out of the fight with colors flying.

On the night of June 21 the truck arrived at Kinderhook, N. Y., having covered about 200 miles, while shortly after midnight New York City was entered. At Newburgh the truck was escorted through the streets of the city by a big crowd. On June 21 it covered 96.7 miles. The roads were in very good shape, although some rain had fallen.

June 22 the total distance traveled amounted to 319 miles, the day's run being 128 miles. At Schenectady a big automobile procession escorted the truck through that city. The truck arrived at Syracuse June 23, being received by an impromptu parade of motor trucks, in which the local Automobile Club took part, running the last 15 miles with the Alco. On this day many of the roads traversed were undergoing improvements, this often rendering necessary a detour. Other severe tests through which the truck passed were occasioned by sharp gradients, and the variable surface of the roads, some being of a soft, gritty character and others being well covered with projecting lumps and rocks.

Between Syracuse and Rochester many bad roads were encountered, as here also many of the State roads are undergoing a process of reconstruction. Sand was successfully passed through, and about 98 miles were covered, the whole route being sprinkled with onlookers and motor enthusiasts The total distance achieved by the truck at the end of the day amounted to 524.4 miles.

On June 25 a record run was made between Rochester and Buffalo, the distance of 74 miles being covered in 4 hours and 50 minutes, the total mileage being brought up to 660.4.

The road from Buffalo to Cleveland is marked by many bad spots, yet these did not prevent the truck from making a day's run of 128 miles, many detours having to be made.

The eighth day of the journey was completed by the entrance of the truck into Toledo, O. The scheduled distance of 12 miles per hour and an average of 117 miles per day had been adhered to. All parts of the truck had been heavily strained by the rough roads through which the route had lain, but no mechanical troubles had been experienced. On June 28 the truck arrived at Edgerton, O., through roads of clay and sand. In Ohio there were many occasions in which the equipment carried came in usefully, enabling obstacles to be overcome. Heavy rains were experienced at this part of the trip, and sandy roads were transformed into hard going for long-distance traveling.

This Picture Shows One of the Broken Down Bridges, the Truck Having to be Pulled from the Debris by Means of Its Own Power

At Chicago the truck was inspected by Montague H. Roberts, of the Alco Company, who declared that the vehicle was quite able to cope with the rough and sandy roads beyond the Mississippi.

On July 3 Ashton, Ill., was reached, 1308 miles having been covered since the start. Sand, soft earth and many rough and ready hummocks were plowed through. The roads west of Chicago were the worst up till then that had been encountered. Sticky gumbo wrapped itself round the wheels and tires, and accumulated in huge masses. Through this sort of road, however, the truck managed to get a daily mileage of 98. Bridges had till now been strong enough to hold the truck, although later on experiences were different, as will be seen. Only one unloading had as yet been necessary in order to surmount a difficult way.

In Iowa the bridges were very weak, and near Keystone the truck fell through one, this being the second in 3 days. It was jacked up and pulled through by means of its own power. The Iowa route all along should have better bridges, and the latest disasters happening to the truck have awakened public sentiment on the subject.

At this point the Denver Board of Trade asked the truck to supply information on the roads and bridges on their way to the west, the truck thus assuming the rôle of a pathfinder in addition to a deliverer of goods.

Iowa was a hard state to tackle, and it was a relief to the truck party when it arrived at Boone, after having examined over 40 weak bridges, in a temperature somewhere round 98 degrees, and making a day's run of 56 miles, the total mileage having now reached to the number of 1581. Hill climbing was also another hardship, 300 feet having been the increase in elevation for the day. About 30 miles west of Marshalltown the Denver party sent to meet the truck was stopped by rain, but the truck itself pushed through a mass of gumbo.

July 8 was the hottest day yet undergone, 100 degrees being reached. Through the heat the truck made its way westward of Boone, Ia., till about 30 miles southwest it reached tracks that were impassable. Slippery gumbo was rendered doubly treacherous by the heavy rain that had fallen and the truck was forced to double its tracks and take a northern route, going south to Omaha. Arion, Ia., was reached through a veritable sea of heat, mud, sand, weak bridges and hot winds. Many hours had to be spent in re-planking bridges in order to make them sufficiently strong to bear the weight of truck and goods, 8 hours being consumed in this sort of job in 1 day.

On the next day, July 9, another weak bridge gave way, although no actual damage was done. About 6 o'clock in the evening a heavy thunder storm swept the country, and roads were turned into inland seas. A barometric rise of 550 feet was recorded. Between Arion and Omaha only two horse buggies were passed by the truck on the almost impassable roads. Another bridge nearly caused a disastrous plunge into a gully 30 feet deep, and it was only a previous examination of the bridge that saved the truck from an accident.

At Omaha the truck party was advised by men who knew to go through Nebraska by way of Kearney and Julesburg, rather than by Hastings and McCook. An advance guard was sent out to herald the oncoming of the truck party all along the Platte river valley. At Omaha the crew remained a day, on account of the keen local interest shown, especially by the Omaha Commercial Club.

The next day, July 12, marked the advent of Mayor Wolz of Fremont riding east to meet the truck party. Enthusiastic demonstrations occurred everywhere, and receptions by commercial clubs was the order of the day. All along the route through Nebraska the crew were guests of the Platte Valley Transcontinental Association. Roads were now far better than in Iowa, and a daily run was achieved of 135 miles, and this would have been even greater had not delays been so often necessary to receive with courtesy the numerous honors paid to the truck and its crew. The temperature was around 94 degrees, and the rise in the elevation for the 12 hours of the day 665 feet.

Just west of Kearney the famous continental half-way sign was passed; 1,773 miles had been traversed. Sutherland was the point arrived at at the end of the day, near the western border of the state. At O'Fallons the crew had a 5 hours' fight with a very bad stretch of sand, and a road had to be built with the planks the truck carried.

The Truck Traveling on a Road of Gumbo

Testing Weak Bridges Took Up a Great Deal of Time All Along the Route, Especially Through the State of Iowa

The Truck Crossing a Trackless Prairie

Colorado was entered with a record of 2184 miles in 24 days, having crossed nine state borders. Although a clear and consistent run was expected through Colorado, it was here that the worst disaster befell the truck. The huge irrigation canal engulfed it in a sea of alkali mud, owing to a break, and the crew was 27 hours without food. No sooner had this obstacle been overcome than the truck was immersed in another canal, owing to the breaking of a treacherous bridge, although previous examination had shown the structure to be apparently well braced. It was, however, badly burned in vital places. The truck was guided round 40 miles to escape another flood, across a trackless prairie, by a range rider. The mileage at the end of the day had reached 2252. Never before had motors been across the tracks that were on this day followed by the Alco truck; such tracks had even been avoided by horsemen.

On July 21 entry was made into Denver, and a big reception was given the adventurous crew by the business men and motorists of the city, and from there onwards it is hoped that the truck will pursue the mapped-out course.

The obstacles overcome each form a feather in the cap of the motor truck as a means of long-distance delivery.

A very good idea of how these obstacles were overcome can be obtained from the following communication from E. L. Ferguson, the captain of the truck party:

> "The experiences of the transcontinental Alco along the route followed, known as the Iowa Official Transcontinental route, can never be repeated by any who may follow because many of the bridges we crossed will this year be replaced by concrete structures, with few, if any, wooden affairs left by the end of 1913.
>
> "Horatio at the bridge had nothing on us. We defended in many ways. We rebuilt, replanked and reconstructed times almost too often to count. We strengthened worn flooring with planks, supported weak stringers with boxes of soap from our load and held in place rotted or washed out header beams with 10-ton jacks or block and tackle. The applied details of each method were as varied as the methods.
>
> "In the trip across the state over 500 bridges were examined and no less than 100 were given some kind of attention.
>
> "None of this would have been necessary with a touring car; but it must be remembered that weight was always against us. For a touring car, a journey across this route is ideal under average weather conditions.
>
> "There are several sections that are yet to be gravelled. Through these, during or immediately after a rain, touring is best postponed for at least part of a day.
>
> "It is a peculiar quality of the natural soil that when wet it cakes into huge masses and at the same time has a surface that is as slippery as grease.
>
> "It is treacherous to walk upon, and even a light touring car is likely to go crabwise rather than in a forward direction. Tire chains are of little value because they immediately become filled and then form the best sort of a foundation for huge masses of caked clay. However, there is the redeeming feature that the roads rapidly dry out, and half a day changed them back again, making a most delightful surface to drive over, especially where they are in sections that use the King log drag.
>
> "To those only familiar with constructed road surfaces of any kind, any word painting will fail to convey the conditions of driving over a wet gumbo road. Even those who have experienced it in a touring car can but faintly realize a heavy truck's difficulties.
>
> "If one imagines an asphalt road covered with three or four inches of the slickest grease—for the under surface of the gumbo road is hard; it is the top layer that slimes—then some idea can be had of what Charles W. Young & Company's Alco truck encountered during three days of the trip across Iowa.
>
> "Many think of Iowa as a flat state, an error soon corrected in crossing from the Mississippi to the Missouri rivers. Others think of the state as rolling prairie, a term conveying to the mind long gradual ups and downs. Drive across it and there will be found some of the stiffest of hills with the sharpest grades that ever came within ken.
>
> "The truck negotiated them without once removing the load, but the low gear was mighty handy going up two of them that varied from fourteen to seventeen per cent on the gradometer. One was particularly tough climbing, inasmuch that the surface kept crushing through under our weight."

Gasoline Truck Field

Makers Give Statements of Business Conditions in the Market During Period from June 15th to July 15th

Business has generally been good during the last month, and manufacturers are endeavoring to impress buyers with a knowledge of the superior merits of motor over horse traction.

If a comparison is made between the sales of gasoline trucks effected during the last month and those effected during the same period of last year, some idea can be gathered of the great strides with which the motor truck industry is progressing. We have endeavored to obtain from makers of gasoline trucks the reasons why customers have superseded their horse vehicles by motor trucks. In only a few cases, it seems, have the manufacturers studied this point, as the following communications show. It is, however, evidently a point worth studying. If a maker finds out why it is a customer is induced to change conservative ideas of transportation into those favoring motor traction he can adapt his goods to those requirements and appeal by similar reasons to his customers.

Velie Motor Vehicle Co., Moline, Ill.—Many good inquiries have been received. Nearly all lines of businesses seem to require commercial vehicles, especially long hauls, and people who are operating more than three teams. Grocery houses are considering trucks at this time and there seems a very good field in this connection. Florists, dyers and such concerns are also making inquiries. There seems to be a great demand for 1-ton trucks in Chicago, especially those in the grocery line, where they go to a given point and get a load of merchandise to deliver to their salesroom, and will use the vehicle for short hauls and light delivery.

Speedwell Motor Car Co., Dayton, O.—Commercial vehicle business during the period of June 15 to the present was very good. Coal and ice, contractors and breweries have been the three leading purchasers. The percentage of increase is approximately 180 per cent. Few propositions have been put up to the firm in which it could not show greater efficiency and large saving over horse-drawn vehicles.

Lippard-Stewart Co., Buffalo, N. Y.—Sales were equal to expectations. Demand was from grocers, butchers, ice cream dealers, dry cleaning houses, laundries, florists and

Jacking the Rear Wheels from a Bad Rut

Alco Truck Traveling Along an Uneven Road

hardware dealers. The firm finds that leading concerns are satisfied to continue horse-delivery service on account of it having been satisfactory in the past. It is only a matter of educating them, however, to the economy in the use of a motor-driven delivery vehicle.

Lauth-Juergens Motor Car Co., Fremont, O.—The commercial vehicle business during the period from June 15 has been very good; in fact better than anticipated. The percentage of increase was about four times that of last year. Most of the leading concerns state as their reason for superseding horse by motor traction that it is a matter of saving dollars and cents with them, and this is their reason for equipping with the motor vehicles.

Universal Motor Truck Co., Detroit, Mich.—Sales were excellent for the last month. During the hot weather, however, they fell off. The demand for commercial vehicles was very diversified.

American Locomotive Co., New York.—Business remained consistently good during the last month. Sales were as good as anticipated. The percentage of increase in the business for this period (June 15 to July 15), compared to a corresponding period a year ago, was considerably greater in the motor truck field.

Packard Motor Car Co., Detroit, Mich.—Business recently has been excellent. The line of business which has purchased the greatest number of trucks from June 15 to July 15 has been the express business. There were more than 12 trucks ordered for this line during the month. The sales for the period from June 15 to July 15 have increased almost 45 per cent over the business done the corresponding time last year.

Knox Automobile Co., Springfield, Mass.—Sales during the period of June 15 to July 15 were better than anaticipated. They averaged better than 1 a day, and this is the rate of production. Ice companies have been the best customers during this period. Very few concerns with whom the company comes in touch are offering any reasons why commercial vehicles will not do better work than horse-drawn vehicles. Of course there are some conditions under which motor trucks are not a good investment. The field at present is so large that salesmen are not spending their time trying to convince concerns that they should install motor trucks where there is any doubt of their economy. They are following up those concerns whose transportation conditions specially apply to motor trucks.

Kisselkar Motor Co., Hartford, Wis.—The business done between June 15 and July 15 was in excess of the preceding year, and if facilities had been greater more sales would have been effected. The sales were really better than was anticipated. The company says that no truck users report that commercial vehicles are inferior to the horse-drawn vehicles; on the contrary, it finds the commercial vehicles take the place of 2 or 3 teams of horses in every instance and the cost of moving the product in about the same proportion.

Montreal Fire Trucks

Since Motor Apparatus Has Been Installed the District Covered Has Been Extended 50 Per Cent.

Motor fire apparatus costs just about one-quarter the cost of horse apparatus. The five remaining horses at one station in Montreal are soon to disappear and their places taken by motor fire engines.

The day of the horse is passing in Montreal as far as the Montreal Fire Department is concerned.

District Chief Man stated that in No. 20 station, where 12 horses had been quartered previously, there were but 5 at the present time, and that these would go before many weeks had passed.

Chief Tremblay stated that since the motor apparatus had been installed the efficiency of the force had been increased materially and that the economy effected would be one of the most prominent characteristics of the transfer.

"The district we cover here at No. 20," he said, "has been extended about 50 per cent. since the motors have come, and when they have become installed throughout the central districts of the city the efficiency of the brigade will be increased fully 50 per cent. in addition. It costs, too, just about one-quarter to maintain motor apparatus of the keep of horses, and this will be one of the chief factors in replacing the old equipment by the new."

Montreal's new motor fire engine was inspected recently on the Champ de Mars, in the presence of a number of the fire department officials and the members of the Board of Control. The officials are well satisfied that it will be quite a valuable addition to the fire department. The big Lafrance engine traveled around the small enclosure at a terrific speed, and later climbed some of the steeper hills in the vicinity of Mount Royal.

Though the engine and the motor truck together weigh about 10 tons, no difficulty was experienced in handling the car. The truck is capable of doing the work of six horses, and will be put into service at once.

Ottawa also owns a motor combination chemical and hose wagon, and this is to be converted into a salvage wagon. An experiment is to be made with the motor combination wagon. At present, in addition to the chemical tank and hose, 1000 feet of regulation hose is carried. Instead of 1000 feet, the amount of hose will be cut to 500 feet and provision will be made for carrying a large supply of salvage covers.

Transcontinental Truck Speeding on a Good Road

Motor Vehicles for Florists' Deliveries

Use of Truck in Light Retail Delivery Work—The Delivery Problem of the Florist—The Situation in New York and Chicago—The Best Delivery Vehicle for the Florist

FLORISTS must have a delivery service which will combine speed with availability at all times and due care for the fragile nature of the flowers. In New York all the leading retail florists possess motor delivery vehicles, generally of smart and striking appearance, the vehicles forming a splendid advertisement. Wholesalers also use motor vehicles for the delivery of flowers from greenhouses to stores in the city.

ONE florist in New York, if he were deprived of his motor vehicle, would not undertake deliveries at all rather than return to horse-vehicle delivery. The general opinion of all leading florists is that no up-to-date man can be without his delivery motor vehicle, chiefly because he must keep abreast of the times and because it renders better service to the customer. Wholesalers must also possess motor vehicles.

THE use of the motor vehicle in light delivery work is becoming more and more general; it is only necessary to walk through the large retail districts of the big cities to become aware of this fact. Each separate trade is beginning to perceive that the motor truck is the one means of delivery that will bring satisfaction to both owners and customers, and at the same time will extend business in districts not hitherto exploited owing to their long distance from the center of delivery.

The florist business in such large cities as New York and Chicago is by no means a small one. In all large cities those businesses dealing in goods that may be considered as luxuries almost continually thrive and prosper, although their periods of prosperity vary with the influx or departure of the moneyed classes from the city. The customers of such businesses having the money to spend are quite willing to pay for special service as a convenience to themselves, and also for originality of design or shape in the goods bought. There is scarcely anyone not possessed with that rather snobbish characteristic of desiring to get something better than his or her neighbor. The retailer has to provide that something better, whether in the nature of goods themselves, in the mode of delivery, or in the package or wrapping of the goods. Somehow or other a note of originality must be struck.

The Delivery Problem of the Florist

Just consider for awhile the delivery problem of the florist: He deals in perishable goods. He must have rapid transit from the conservatories, probably situated some distance outside the city, to the store, and likewise, to the residences of his customers. His orders are not regular weekly or daily orders, as those of the grocer or butcher, but come in an entirely haphazard way, large orders with small at all hours of the day. And the purchasers of flowers are very often rather peremptory in their wishes. A woman *must* have such-and-such flowers at a certain hour of the day, no matter whether the florist tells her it is impossible or not. In such cases the customer is the commander and the seller must either obey or lose valuable trade. Certain orders are delivered in the morning, and changed again at noon, to be executed in the evening. Big orders, for funerals or weddings, come along in just the same way, often at a moment's notice, and at distances far removed from the head store. Thus it can be seen that the delivery system of the florist, unless he wishes to lose his most valuable customers through dissatisfaction with his method of carrying out their desires, must be one in which speed and instantaneous delivery must be accompanied by that elasticity which will permit a vehicle to operate in any direction, according to the tendency of orders.

A florist's vehicle must be a smooth runner as jolting and jerking will not at all add to the appearance of the flowers. It must have a large carrying capacity in so far as bulk is concerned, but its capacity for weight need not be great. Its appearance should be smart and attractive, as it is to move through fashionable districts where such an exterior is a moving advertisement, and it must be capable of high speeds. It also should be available at all times of the day for fulfilling the orders, however slight, of those regular customers who have no hesitation in giving the most trifling orders and requiring delivery in less than no time.

The Only Solution to the Problem

The motor vehicle is practically the only solution to the delivery problem of the florist. It possesses the requisite speed, appearance, capacity and availability, and in addition the possession of a motor delivery vehicle on the part of a retailer of any kind is a sign to all men that the owner is keeping up with the movement of the age. Outsiders are very quick at judging from external appearances, and it is quite logical to assume that a man who allows his delivery system to become rusty, as it were, is also going to be behind-hand in materials and methods of manufacture, and consequently in selling price. This is the beginning of the age of motor vehicles for retail house-to-house delivery, and business men in every branch of trade are recognizing this fact.

Motor vehicles are more used by florists in New York than in Chicago. Indeed, with one or two exceptions, all the leading florists of New York now employ motor vehicles, wholesalers as well as retailers. In Chicago, however, although the leading retailers use them for house-to-house delivery, there is scarcely a wholesaler who owns one.

It is only from the experiences of users that the actual value of the motor vehicle in the florist industry can be gathered.

Florist Situation in New York

The number of florists in New York amounts to about 430. Of these, the largest are situated on Fifth avenue, while several own two or more stores in various parts of the city. Charles Thorley, Fifth avenue, owns 2 C. G. V. motors, together with 3 one-horse vehicles, an additional one-horse vehicle being employed in the busy season, which is winter. It has been estimated that these 2 motor vehicles do as much work respectively as 2 horse-wagons, that is to say, if the motor vehicles were discontinued, 4 horse vehicles would have to be employed to carry on the same delivery service, but with far less speed in delivery and not with such entire satisfaction to customers. The body of the vehicles, which are identical, measure 7 feet long by 6 feet high, and thus are capable of carrying palms in flower pots, small trees, etc. The motors in each case are four-cylinder ones, and have 30 and 35 horsepower respectively.

The market to which these motor vehicles deliver extends 40 or 50 miles outside the city, while orders from parts still more remote are executed by express delivery. The average number of miles covered per day by the motor vehicles is from 35 to 50 miles. They have covered as many as 108 miles in one day. Generally speaking, the routes are regulated entirely by orders, but in the busy season regular routes can be followed, as orders at that time are more capable of being systematized to some definite scheme of delivery. Not many small deliveries are made.

The body of the motor vehicle was made after Mr. Thorley's own design. It is a closed body, and is painted red, and ornamented with black panelings presenting a highly finished and pleasing appearance. The drivers are regular chauffeurs, and are paid higher wages than would be paid to horse-vehicle drivers in similar positions. No figures were obtainable regarding the cost of upkeep and operating expenses or annual cost of tires. With regard to the latter, Republic non-skid tires are used. Very little time is lost in loading and unloading, these operations being performed with the utmost celerity. The flowers are generally packed in long cardboard boxes, the boxes being packed in the closed-in bodies of the vehicles, thus being protected from all inclemencies of the weather. In winter, especially, the motor vehicle is found of use in protecting the flowers from extreme cold, the gasoline providing sufficient heat for this purpose.

Four Motor Vehicles Owned by One Florist

Another Fifth avenue florist, Wadley & Smyth, runs 4 motor vehicles in house-to-house delivery. The 4 wagons are of different makes, being a Packard, Fiat, Overland and Hewitt, respectively. These are all in regular service. In addition to the motor vehicles, the firm has 2 wagons drawn by 4 horses. The journeys undertaken by the trucks vary according to the orders, some trucks going to Long Island and other distant neighborhoods. The trucks are all of from 2 to 3 tons capacity. As well as being used for retail delivery, they are used for conveying flowers from the wholesalers when special orders have to be executed. The availability of the truck for such special journeys is a marked feature of its usefulness.

Although the cost of keeping these 4 motor vehicles is greater than the cost of keeping a similar number of horse vehicles, yet the work done by the motor trucks is very much greater, and compensates for the additional cost of upkeep and operation. The firm has experienced one or two breakdowns, but these were easily remedied by a telephone message and the despatch of a horse to the assistance of the vehicle. As such an aid in times of trouble the horse still retains its usefulness and should not be despised.

Pneumatic tires are used on the trucks, a sufficient amount of resilience being necessary for such fragile goods as flowers. The methods of packing, however, practically safeguard the flowers from any mishaps due to jolting or fast riding.

Closed-in bodies are used in all cases, it being considered that such are the best suited for purposes of regular delivery. The bodies are painted in dark brown, on which is inscribed the gold lettering and usual design of the firm.

The trucks make two, three, four or more journeys a day, and are also used for conveying flowers from the firm's own conservatories, as well as from those of the wholesalers, as mentioned. Each truck is in charge of a driver and a boy. New drivers were obtained in each case, and although they cost more, it was thought that a skilled mechanic was a better proposition than a horse-vehicle driver.

The Fiat truck has a conventional 1908 Fiat chassis formerly used as a touring car. In changing the duties of the car, no alteration whatsoever was made in the mechanism. Mr. Smyth had the body built himself for use in the business.

Alexander McConnell, Fifth avenue, has a handsome motor vehicle, used for bringing flowers from the firm's own wholesale headquarters to the store and for retail delivery. It is considered here that a firm cannot possibly keep equal with, or forge ahead of his competitors without the aid of the motor vehicle. Even when standing idle outside the store the motor vehicle is an actual representative of the firm's high standing. This firm has a very large number of small orders, and it is in the delivery of these that the motor vehicle is largely and usefully employed. Pneumatic tires are used. The repair bill was heavy, and it was thought that once a means of bringing down this item were ascertained by the manufacturer then the use of the truck for light delivery work would progress by leaps and bounds.

Business Increased Directly with Motor Vehicles

One electric motor vehicle, 1 gasoline and 5 horse wagons are owned by George M. Stumpp, Fifth avenue, and these are all kept busily employed in the brisk season. Directly the motor vehicles were adopted, it was found that business was gradually increasing in volume in all directions, and had it not been for the adoption of the motor vehicles, and if the business had made the same progress without them, it would have been necessary to employ many more horses than are at present used, even allowing for the 2 motor vehicles. In fact, in every way, the influence of the motor vehicle on the business has been remarkable. In the olden days of regular horse traction, when the motor vehicle was but a dream, if an order was handed in for delivering flowers at some distance from the city for a wedding or a funeral, one whole day would be taken for the heavy vans employed to reach the neighborhood. Then these had to be stabled for the night. The festivities taking place the next day, it was necessary to keep the horses and wagons idle during that time, and the journey home would extend into another day. Sometimes even big vans were sent out 2 days before, and thus were being utilized on one job only for 5 days. Now, the gasoline motor vehicle can accomplish such journeys in 1 day, taking and bringing back in the space of 24 hours.

The Customer is the Main Point

The main point to consider, in the opinion of this florist, is the wants of the customer. If a good customer came into the store and gave an order for 50 cents' worth of flowers and wanted it delivered to his house at about 10 miles out of town it must be done, if the patronage of that purchaser is not to be lost. Buyers of flowers are often very unreasonable. Orders for flowers to be presented at theaters are given perhaps after 6 o'clock, and the flowers must be sent round to the theater there and then. Or perhaps a young man may come into the store and want a big bouquet of flowers sent to his fiancée at once; such people are always unreasonable in their demands, but it is necessary to satisfy them, as generally big business results.

Another point where the motor vehicle has been of special use to this firm is in the matter of long-distance deliveries of large packages formerly delivered by express on the railroads. Small packages only are now carried in this way. Horse vehicles would have been useless in such delivery, and the gasoline motor is the only means by which orders from long distances can be executed. The out-of-town market now extends for 50 miles or more.

The gasoline truck accomplishes a greater mileage than the electric and is used for all the far-distance work. The electric is used for the town and smart district deliveries, where its appearance creates a favorable impression.

The two vehicles are very rarely idle and make many journeys per day. It is found that it is impossible to regulate these in any way, as so much depends upon where the customer is residing and his or her special requirements. If the flowers are wanted quickly, then they are delivered quickly. At the short stops made when delivering the flowers the engine is generally kept going, as the stops, although frequent, are not long. The average length of run per day is 35 miles, including summer and winter. In winter, of course, the runs are much longer and much more frequent.

The electric vehicle has a body admirably suited for a florist's car. It is half of plate glass, so that the interior can be seen by outsiders, thus advertising the goods. The plate glass on this electric truck has never been broken, although the truck has been in use for many years. The truck is provided with adjustments for shelves, so that these can be arranged at various heights. The gasoline truck has a plain body, closed in, of wood. This is painted green, that color being considered as most typical of the florist industry, and on this is placed the crest of the owner, the whole presenting a handsome and noticeable appearance.

It costs a trifle less to operate the gasoline than the electric, owing to the cost of the tires. A good electric driver was hard to get in the first place, one who thoroughly understood the machine. Both drivers receive bigger salaries than those formerly paid to the drivers of the horse vehicles that the motor wagons replaced.

One Motor Replaces Three Horse Wagons

Max Schling, Fifty-ninth street, has an autocar with 18-horsepower, 2-cylinder motor, and with a capacity of 1 ton. The number of deliveries made per day varies considerably, the car sometimes making 20, 30, 50 or even more. The routes are irregular, depending entirely on orders. The vehicle has been in use for a year, and has taken the place of several horse vehicles. No horse vehicles are at present used.

The average annual cost of operating the vehicle, including the cost of upkeep, has been estimated at about $1,650. The car is very rarely out of use, and an almost maximum quantity of work is obtained from it. The tire cost for the year is figured at $180. Many out-of-town deliveries are made, and the truck will hold 150 of the boxes in which the flowers are packed. The vehicle is always in charge of the driver and one assistant to aid in unloading. The loading is done by the staff at the store.

It has been found that this motor vehicle has three times the value of one horse wagon, or in other words, it would take 3 horse wagons to replace the motor vehicle at a greater cost, and with far less satisfaction to customers. The truck was acquired with the sole object of meeting the demands and requirements of customers, not with the aim of saving money in delivery. In reality, however, the only additional cost, after the vehicle has been purchased, is the salary of the driver, for the cost of operating 3 horse vehicles works out to far higher figures than the cost of operating their equivalent, the 1 motor vehicle. And there is really not a very great difference between the initial cost. A good automobile costs about $2,500. A good horse wagon can be bought for $500, while it requires from $250 to $300 to purchase a horse. Thus, 1 horse wagon represents an initial outlay of about $800, nearly one-third the cost of the motor vehicle. The cost of 3 horse vehicles, the equivalent of the motor vehicle, amounts, therefore, to practically the same sum.

The vehicle owned by D. J. Pappas, Broadway, serves a double purpose; in winter it is used as a retail delivery truck, and in summer the body is replaced by a pleasure car body, and the car is used as a pleasure car. It is a 4-cylinder Reo. In the winter season it has traveled as far as 180 miles in 1 day, the general day's run averaging about 50 miles. It has been in use for 2 years, and the driver was originally a horse-vehicle driver in the service of Mr. Pappas. It replaced 1 horse vehicle and two special boys, but the owner considers now that the motor vehicle itself could not be replaced by any number of horse vehicles; in fact, Mr. Pappas said that if he could not have his motor truck for delivery work then he would not deliver at all. This statement in itself, after a car has been in active use for a year, is a splendid testimony to the powers of the gasoline truck in retail delivery work.

20,000 Miles Covered in One Year

In 1911 the inclusive cost of running the car, including storage, a considerable item, amounted to $1,300. During this year it covered 20,000 miles. The deliveries are made in all directions around New York, and the length of the stops for delivering is minimized to the lowest degree. The owner is altogether very much satisfied with his truck, and considers it in addition to being a splendid means of delivery as a fine advertisement for his business.

Firestone pneumatic tires are used, and these are much bigger than the wheels were originally built for. The greater resilience thus gained is of special benefit when such frail goods as flowers are to be carried. In consequence the flowers are not at all affected by rapid motion, and no limit of speed is necessary.

The conservatory department of the Conyers Farm at Greenwich, Conn., uses a 5-ton Mack truck for delivering perishable and delicate plants to customers within a radius of 50 miles from the farm. This truck is reported to be saving them hundreds of dollars per year by delivering the product in a better conditon and avoiding complaints regarding slow deliveries of plants which fail to live owing to the drying out of the roots from the slow delivery by horse equipment.

The Julius Roehrs Co., Rutherford, N. J., another wholesale florist, is also using a 5-ton Mack truck for delivery of its products within 100 miles of its plant in New Jersey.

Florist Situation in Chicago

In Chicago, the wholesalers, so far as can be ascertained, do not use motor trucks for delivery to the retailers, although some of the latter are of opinion that such an innovation is very desirable. The flowers are generally conveyed from the greenhouses to the stores in the city by express delivery or railroad. Horse vehicles are also used for this purpose, making only one journey per day, and returning in the evening with empty boxes. The question of adopting motor vehicles for this purpose has been under the consideration of some of the leading wholesalers, such as the Poehlmann Brothers Co., for some time, but no actual result has yet been forthcoming.

Some of the dealers in the city pay men to bring flowers from the greenhouses in small boxes, and deliver small consignments to the retailers in the city. In the case of Poehlmann Bros., delivery from the greenhouses to the store in Randolph street, a distance of 13 miles, takes from 1.5 to 1.75 hours.

Other dealers have the flowers brought by railroad from the growers in the outlying districts. All the wholesalers have their city headquarters round about Randolph street and Wabash avenue. The retailers send buyers round to select flowers from these headquarters. Some wholesalers act as middlemen and sell on a commission basis, not having greenhouses of their own.

There are about 270 retail florists in Chicago, and perhaps the leading one is Fleischman, Jackson and Michigan avenues. This firm has two Stoddard-Dayton trucks that have been in use for 4 years, and which replaced 3 wagons and 5 horses. The number of journeys per day depends upon the extent of the orders and the distance to be traveled. Orders are executed by these trucks as far as 75 miles outside Chicago. The trucks are used for retail work only, that is, for conveying flowers to customers and not for bringing flowers from the wholesalers to the store. It is found that the service rendered by the motor vehicles is far superior to that of the horse vehicles in every way. The cost of upkeep is greater, but this additional cost is eliminated by the better service.

New drivers were employed when the motor vehicles came into operation. The bodies of the vehicles are of a special and very distinctive design, the result being a remarkably elegant appearance, such to occasion notice. The owner considers these 2 vehicles as a first-rate advertisement. In future, he thinks, all florists with any extensive trade, and who do not wish to be left far behind, are bound to use the motor vehicle as a delivery wagon.

Stollery Bros., Wilson avenue, has one Flanders gasoline truck, that makes an average daily run of 60 or 70 miles, delivering to Wilmette and Oak Park and other outlying districts. House-to-house delivery is made, the journeys and routes being dependent on the orders. The vehicle has been in use for 2 months, taking the place of a one-horse vehicle, the driver of the latter having now become the chauffeur of the former. The upkeep is heavy, and the owner considers the Chicago roads are very bad. Filled tires are used, the filler in this case being Zilio, a vegetable compound. Already, however, Stollery Bros. have found that the possession of a motor vehicle has considerably extended their market.

An Introduction to Bigger Markets

From these typical examples, taken from the leading florists in the two largest cities of America, it can be seen that in this particular industry the commercial car is a present and coming proposition, with a big future before it. The chief advantage of the motor truck to florists does not lie in the fact that it is a quicker means of transportation, but because it is a means whereby customers are benefited, and also because it extends markets and is a good and permanent advertisement. Perhaps it would be as well to indicate what the chief objections to the use of the motor truck as a means of delivery in this industry are. There is, to begin with, the initial expenditure. A florist may at starting figure this as a complete loss from capital, but he possibly forgets that the possession of the car is an addition to capital, to business, to advertisement, and to possibilities. The car is his introduction to bigger markets.

The cost of upkeep, the driver, and insurance rates are all higher. He must be prepared to pay away money at the start. No business was ever successfully floated without capital and a big purchase of working material. Before the goods are sold and the profit pocketed, the raw material has to be bought and the workman paid. To the rising florist, the best proposition is to purchase one motor truck, possibly an electric or a low-rated gasoline vehicle, and use this for his town deliveries, keeping on at the same time his horse vehicles. Then, when his business has grown sufficiently to warrant the purchase of another vehicle, he should purchase a gasoline truck for his long-distance journeys, at the same time selling part of his horse-vehicle equipment. As time goes on he will entirely supersede horse traction by motor traction, benefiting both self and customer.

For the big florist who sees these competitors poaching on his grounds with success because of their superior service and their power to cater to new markets, the best plan is to take a bold plunge and dispose of all his horse vehicles and buy a fleet of motors to take their place. It will be the only way to keep abreast of the times. The florist industry has many rises and falls of prosperity. It is not based on credit, or on regular orders at stated times; it is based on the caprice of customers.

The small florist need not think of the motor vehicle until he has widened his business. In this industry the motor vehicle is for the big men, for the men who have customers spending big money.

In busy seasons the hiring of motor vehicles for additional deliveries is a good plan. An effective poster pasted on the body of the car notifying a special Christmas or Easter delivery is a fine advertisement for a firm.

The Main Cause for the Adoption of a Truck

The necessary irregularity of routes is thought by some to be a drawback against the adoption of the motor vehicle in this industry. Regular routes are, of course, better from an expense viewpoint, as a truck can be packed to its fullest capacity and despatched at regular intervals, so arranged as to get the most out of the truck that one can. Such a condition in the florist business, however, is almost impossible. To arrive at a true viewpoint of this question it is necessary to remember once again that the truck has not been purchased to save money in delivery. That may follow afterwards, but the main and principal cause for the adoption of the truck is—as stated—*to benefit the customer.* If the customer is satisfied, then the florist should be so. In busy seasons it will be found possible to arrange some sort of systematic route, but there should always be a truck ready for the emergency order; by executing that readily business is strengthened fourfold.

The best body for a florist's car, from an outsider's point of view, is undoubtedly that with plate glass sides. The flowers can thus be seen by everyone, and experience with this kind of body has proved satisfactory. The closed type of body, however, with wooden sides, attractively painted, and ornamented with the owner's name, is the design more generally adopted. Some florists, Fleischman of Chicago, for instance, have quite a unique design which may be characterized as dictinctly floral; originality always spells progress.

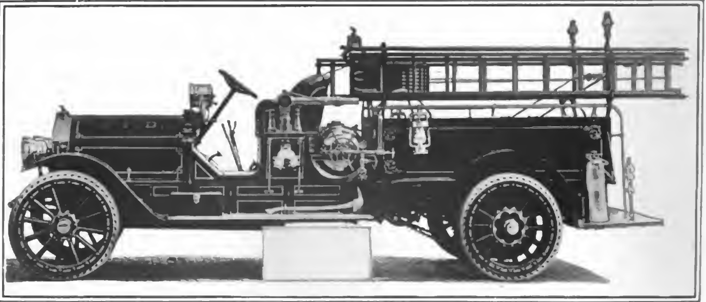
The Inside of the Wagon

The inside of the wagon should have extending round the sides a ledge whereon shelves can be laid, thus permitting boxes to be packed on and underneath the shelves, relieving the weight on the lower boxes. Several shelves can be so arranged at various heights. When the vehicle is required to carry palms, shrubs, tall plants in flowerpots, the shelves can all be removed. A medium-sized motor truck will generally carry ten or twelve of the big flower pots usually used for palms. Hooks might also be attached to the roof of the vehicle to allow for the suspension of bouquets going short distances. If the cold during the winter is so excessive as to affect the flowers even allowing for the heat of the gasoline, a heating apparatus could easily be attached to the exhaust, and an even temperature be kept inside the vehicle. The floor of the body should be as near the ground as possible to facilitate packing.

If the florist hesitates to choose between an electric and a gasoline truck, he should consider for what service he desires the vehicle. The electric is the better vehicle for short distances in smart neighborhoods; the gasoline is the better for long-distance journeys out of town.

Pneumatic tires are almost always used for this service, due to their resilience and resilience is the great desideratum.

MUNICIPAL SERVICE EXTENSIONS



Kissel Combination Wagon for Salina, Kan., Fire Department

Fire Vehicle Growth

Springfield Demonstrates Value of Complete Motor Equipment—Salina, Kan., Ends Horse Regime—Other Progress

THE motor-driven fire apparatus of the city of Springfield, Mass., was put to the test on July 4 and 5, when a total of 30 alarms were sent in, there being 18 alarms on the first day and 12 on the second. The calls came so close together that in some cases there was not sufficient time for the apparatus to return to the engine houses, but every fire was reached before it had assumed serious proportions, practically all of them being put out with chemicals. The total mileage made by the apparatus for the 2 days' fires amounted to over 50, measured from the main headquarters of the fire department. All of this work was done while the thermometer was registering around 90 degrees, a temperature which would have played havoc with a fire department dependent upon horse traction.

Springfield, which was one of the first cities to adopt motor-driven vehicles for fire department use, has at present eighteen Knox machines in service, two electric hook and ladder trucks and an electric chemical machine. The department is most completely equipped, there being all types of apparatus from chiefs' and chemical cars to special life-saving vehicles and a water tower with a Knox Martin tractor.

During a recent week the patrol of Philadelphia made forty-seven trips, with 146 stops and carried forty-eight prisoners, three persons to hospitals, one to the morgue, handled one motor cycle accident case and one automobile case and made two trips for supplies. The truck used but twenty-four gallons of gasoline and fourteen quarts of oil, although the distance covered was over 277 miles.

Salina, Kan., boasts of a complete equipment of motor apparatus in its fire department, the last horse in the department being discarded a week or more ago when a Kissel combination chemical and ladder wagon was installed. The first alarm which the Kissel wagon responded to was received at 8:59.5, and the truck made a trip of a little over a mile in 2:01, arriving at the fire at 9:02.

The Mack company has recently received a contract for 4 chemical wagons from the New York fire department, each of which is built on the standard 2-ton chassis. Bodies are of steel and carry 1000 feet of 2.5-inch fire hose. The body is constructed of either standard hose body type construction or with flared sides and seats for the accommodation of the firemen. Chemical tank has capacity of 30 to 40 gallons and is equipped with Lally quick-opening and self-packing tops. The chemical hose basket is arranged to carry 200 feet of special four-ply hose. Hand rails are provided, running from rear of driver's seat to back step. The fire extinguisher equipment consists of 2 to 3-gallon brake bottle type, mounted in polished brass holders on the rear step. Two heavy duck soda bags are provided. The lighting is by means of two 8-inch headlights, mounted on front spring, together with two side oil lamps on each side of the driver's seat, the electric headlight being provided with current from 60-hour ampere storage battery. The conventional locomotive bell is mounted on the back of the driver's seat or on dash, as may be preferred. The usual complement of firemen's axes, acid receptacle holders, etc., are provided, together with tool boxes, one 12-foot ladder and one 20-foot extension ladder.

The Highlandtown fire department of Baltimore county is making preparations to install a new motor hose wagon, engine and truck into the quarters on Highland avenue. The floor space of this building is being extended 40 feet to make the proper accommodations for the new apparatus. In order that the members of the department might get some pointers on the handling of the motor apparatus the 70 horse power American La France engine used by the Gardenville company of Baltimore county was given a test in Highlandtown.

Pittsburgh, Pa., is keeping up the good work of installing automobile police and fire wagons. Recently Director John M. Morin of the Department of Police has requested five more motor propelled patrol wagons. This makes a total of twelve for his department. Director Morin says that the appropriation for these five patrol wagons would save the city in horse feed $7,750, in the wages of 26 wagonmen $31,200, in the wages of two janitors, $1,642, in additions to the pensions for 26 wagonmen. This would make a total of $41,892.50 saved. Against this he is willing to charge $2,750 for the upkeep of the automobile, leaving a net saving to the city of $39,142.50. He says these purchases will do away with all horse-drawn wagons and all horses in the Bureau of Police, except those of the mounted squad.

Camden, N. J., has installed three Studebaker roadsters, equipped with chemical apparatus, in its fire department to serve as a flying squadron.

West Chester, Pa., adjacent to Philadelphia, is considering the advisability of holding an election to decide if the council shall be authorized to make a loan of $25,000 to purchase motor fire apparatus.

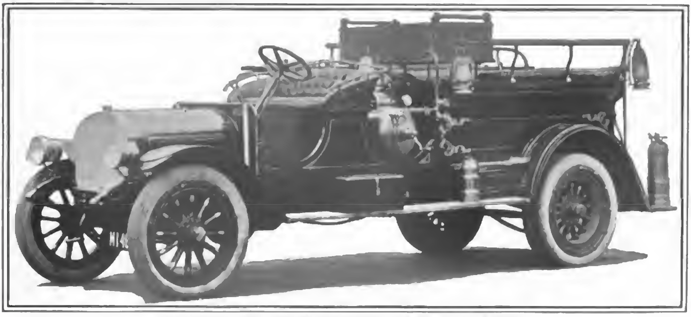
Comprehensive plans for the rehabilitation of the Philadelphia fire department have been temporarily halted by the insufficiency of the appropriation. Bids were asked for and received for certain apparatus to constitute a flying squadron to cost $35,000. To increase the efficiency of motor apparatus in the city it is planned to establish a central municipal garage where all city-owned cars will be available for public services at all times.

Chief Frank J. Wagner of the Washington (D. C.) fire department has determined to replace horse-drawn engines with tractors if he can get Congress to make the necessary appropriations. At present the department has twenty-five horse-drawn engines and only three gasoline-power engines. A new one is to be delivered this month for use by the Petworth company. The present appropriation bill contains an item for the purchase of a motor truck for the Tenleytown company and combination motor engine and hose wagon for Congress Heights company. But the Chief hopes this is but a small beginning, and hopes eventually to have all the present engines displaced by gasoline-power engines. In order to save expense, where the engines now in use are in good shape, it is planned to use them mounted on Cristy tractors.

Anderson Electric Ambulance for Washington, D. C., Hospital

The city of Pittsburgh, Pa., council is planning to spend $100,000 in buying public motors for the use of the people in Schenley Park, the city's largest breathing spot. Objections has been made to the erection of a trolley line, as proposed, in the park, and the automobile idea then developed. It is necessary to have some means of transportation, as there are parts of the parks 3 miles from the entrance. The present plan is to carry children free and charge adults a nominal sum.

The motorization of the entire fire and police departments of East Liverpool, O., was discussed at a meeting of the officials of that city on the evening of July 23. At that time a representative of an automobile concern appeared before the officials and explained his plans. He said that, roughly estimating, the work would cost $35,000. At this figure the company will furnish the city with one triple combination engine, chemical and hose truck, an aerial truck, and convert the three hose and chemical wagons into motor propelled vehicles; a motor patrol and a machine for the fire chief; all to be 100-horsepower with the exception of the chief's automobile, which is to be 50 horsepower. The matter is now being considered by the officers.


Type of Mack Combination Fire-Department Wagon for New York City

The Guarantee of Service for Solid Tires

Leading Solid Tire Manufacturers State Their Mileage Guarantees and Basis of Such and Also Give Suggestions as to How a Driver Can Improve His Truck Mileage and Lengthen Life of His Tires

IN order to get more closely the exact attitude of the tire makers on the guarantee of solid tires as well as the general problem of tire wear the COMMERCIAL VEHICLE asked the following questions of tire makers:

What guarantee in mileage do you give on your solid tires for commercial motor truck service?

What is the weight on your different sizes of tires for front and rear wheels?

What suggestions have you by means of which a truck owner or driver could improve his tire mileage?

Are your mileage guarantees, irrespective of weight, carried on front and rear wheels, or do maximums cover this?

THE mileage you get from a solid rubber tire on your truck depends on the kind of driver you employ, on the kind of streets your truck operates over, on the speeds your truck operates at and on the loads you carry.

If the tires fitted on the front and rear wheels are too small for the loads they have to carry, then their life will be short, it may not come anywhere near the guarantee that the tire maker has given you. If your truck speeds too fast over rough brick pavement one sharp blow by the tire falling into a hole will cut miles off the tire life. A workman does not have to carry an overload of brick or mortar from morning until night to strain the ligaments of his back or shoulders. Carrying one overload will do it. So with the tire it does not require to be cut on every sharp pavement hole; one experience will be enough. Tire makers have realized this and are to-day doing much to educate the truck driver to greater caution: Trying to educate him to slow down when crossing a rough trolley track in which the rubber tires strike the sharp cutting edges of the metal rails and trying to get the driver to load evenly over the entire loading platform so that the heavy crates will not all be stacked on the rear, where it is handy to load and unload and the light ones all up in front—such loading puts a heavy overload on the back tires and lets the front tires go with a big under-load.

To the above questions many replies were received and the more exhaustive ones are here reproduced. From makers the general consensus of opinion is that the driver is by far the major quantity in tire mileage. He can make or unmake mileage. The tire life largely depends on his disposition, on the speeds he travels at, how he loads, and how he picks his route through different streets. He can avoid small pieces of cut glass or he can run over them; he can do a thousand other things that mean money or loss of it to his employer. Here are some expressions of opinion:

Truck Owners Can Increase Tire Mileage

AKRON, O.—1—A. We guarantee Goodrich wireless tires to be free from defects of material and workmanship, and, when used in accordance with our regular schedule of carrying capacities, under normal road conditions, and when not abused or subjected to accidents beyond our control, to run 8,000 miles, within 1 year from the date of application. We will replace any tire which fails under such conditions, making a proportionate charge for the mileage service rendered.

B. When used on fire department apparatus we guarantee Goodrich wireless tires to be free from defects of material and workmanship, and, when used in accordance with our regular schedule of carrying capacities, under normal road conditions, and when not abused or subjected to accidents beyond our control, to run 8,000 miles if used within 3 years from date of application, and provided the weight of the vehicle when not in action is taken from the tires by means of jacks or some similar device. We shall replace any tire which fails under such conditions, making a proportionate charge for the mileage or time service rendered.

2—We copy below our guaranteed carrying capacities for tires of all sizes:

Tire Size	Single	Dual
3 inch	950 pounds	2500 pounds
3½ "	1375 "	3500 "
4 "	1750 "	5000 "
5 "	2000 "	6000 "
6 "	3000 "	8000 "
7 "	4000 "	10000 "

3—We believe truck owners can materially increase their tire mileage; first, by making sure of adequate tire equipment on their trucks when they first purchase them; second, by taking care not to load them beyond their guaranteed carrying capacities, which involves both the total weight carried and distribution of the load; third, by not overspeeding and by keeping out of ruts and car tracks.

4—Our guarantees are based upon the maximum weight placed upon each tire.—The B. F. Goodrich Co., Strong Vincent Norton, manager wireless tire sales.

Saving Depends on Driver and Tire Sizes

AKRON, O.—We manufacture a complete line of both cushion and solid tires, as we have found that different types of vehicles require different types of tires. On slow-moving vehicles where maximum carrying capacity is, and speed it not an item, the regular solid Motz truck tire will meet the requirements providing the car does not travel to exceed 8 or 10 miles per hour. On delivery cars where it is not so much a question of load, but a question of speed, the solid tire has not proven satisfactory, as the mechanical parts of the car are soon shattered.

Having this in mind, we designed a cushion tire from a solid core of rubber, dualing the treads, undercutting the sides and supporting the sides by slantwise bridges. With this construction the tire offers road contact which is a requisite of a tire to give riding qualities. The construction of the tire also permits the absorption of minor road inequalities. The more tire you have in contact with the ground, the better the riding qualities, due to the fact that it bridges over larger ruts and holes in the road. Both the cushion and solid tires are guaranteed for 10,000 miles—2 years.

Printed guarantee is furnished with each set. The tires must be applied according to our rated carrying capacity.

The maximum carrying loads of our solid tires are:

Wheel	Size	2	inch	500	pound	per	wheel
"	"	2½	"	750	"	"	"
"	"	3	"	750	"	"	"
"	"	3½	"	1375	"	"	"
"	"	4	"	1950	"	"	"
"	"	5	"	2200	"	"	"
"	"	6	"	2500	"	"	"

The cushion tire is designed to carry the same weight as the equally rated pneumatic with which you are doubtless familiar.

The saving of operation of a commercial car depends to a great extent upon the driver and also the size tires used; that is, the tires are applied according to their rated carrying capacity.

The greatest detriment to a tire equipment is over-loading. The tire is no more capable of carrying an overload than a man is of being over-worked. It means short life in both cases. Careful driving will also increase the life of the tire. If commercial cars were operated at a lower speed, the operation cost could be cut down materially.

There has been a tendency on the part of some truck manufacturers to under-tire the cars. If every truck owner would be careful to see that his car is not over-loaded and that his driver is cautious regarding his speed, especially over bad roads, he can easily increase the life of both truck and tires 2 to 300 per cent. Every truck owner should determine just what tire equipment is most applicable to his particular work. In the past this point was not given careful consideration in purchasing trucks. In the future we believe, however, that the prospective buyer is going to look into the tire proposition very carefully and select his own tires and be governed by the tire manufacturer regarding the size tire to be applied.

Naturally if the tires are overloaded they cannot do the work. If all tire manufacturers would see to it that tires are applied according to their carrying capacities it would do away with considerable expense which the truck owner is put to, and materially increases the sale of cars. The aim of each truck owner is to do his delivery work at the least possible cost per car mile.

The three requisites of a tire are riding qualities, to protect the mechanical parts of the car, maximum mileage per fuel charge, and long life. If you have these three essentials you will be able to operate your truck at the least possible cost of operation per tire mile.—The Motz Tire & Rubber Co., P. M. Pontius, sales manager.

Absolutely Opposed to Increased Guarantee

CLEVELAND, O.—We are absolutely opposed to any movement whereby guaranteed service to owners would be increased. The conditions surrounding the use of truck tires vary to so great an extent that in some cases it is almost impossible to give the user even an 8,000-miles service guarantee when he persists in operating trucks over rough stone roads, carrying an over-load and driving at too high speed.

We feel that the truck owners should have some guarantee which will satisfy him as to the material and workmanship embodied in a tire, and that a guarantee of 3,000 or 5,000 miles would be sufficient, as any defects would certainly be detected within that mileage, and any service the consumer would get beyond that mileage would be determined by the care with which his driver operated the trucks.

The best method by which an owner may increase his tire service would be to use over-sized tires and see that his driver uses due care in the operation of the vehicle. We contend that 90 per cent. of the responsibility for long tire service rests upon the driver, as he can destroy a set of tires in a very short time if he purposely misuses the vehicle or the tires.

Our present guarantee really amounts to a wager that the tires could not be destroyed in less than 8,000 miles of service and is an injustice to the tire manufacturer for the reason that it is only in exceptional cases that he can detect over-loading or misuse of the tires in any way. Inadequate records, if at all, are kept by the owner and are usually not open to the inspection of the tire manufacturer's representative.—The Republic Rubber Co., B. C. Swinehard.

First Consideration Should Be Choice of Tires

NEW YORK CITY.—In guaranteeing a truck tire, in place of making a uniform guarantee on all truck tires, the conditions of service should be considered, that is the condition of the roads over which the truck will run and the grades, and the class of merchandise to be handled, and the frequency of stopping. It is not, in our opinion, fair to guarantee a certain number of miles to tires on a truck running under the most favorable conditions, and then to give the same guarantee for an exactly similar truck engaged in a similar business but operating under unfavorable conditions, such as roads and grades, and we, therefore, whenever it is possible, prefer to give a special guarantee to those customers who take the matter up with us on these lines, and this is our practice.

To answer your inquiry as to the weight on different size tires, we are assuming that you are referring to the carrying capacity of the tires and this would necessarily be a table of considerable length and we think one or two sizes will suffice. The carrying capacity of a 36 by 5-inch Kelly-Springfield dual block tire is 4,500 pounds, and the 36 by 7-inch dual is 7,500 pounds.

In regard to the operator increasing his tire mileage we are certain that this can be done if, before purchasing a truck the purchaser decides on what tires he is going to use, and after that sees and gets the advice of the manufacturer of that tire, and is guided by his advice and insists on getting from the truck manufacturer the make and size of the tire decided on.

There are many good tires on the market which today are condemned by users for no other reason than that they are not used properly. If they were used under proper conditions they would give very satisfactory service, and as the tire expense is one of the chief expenses in operating a truck, the owner cannot give too much attention to his tire equipment and the best time to attend to it is before he buys them.

He can also increase his tire mileage by operating his truck at an economical speed.

On a truck equipped with the proper size tires to carry the load put upon them, the front and rear tires may be guaranteed for the same length of time or the same number of miles. It is usual to get a little more mileage from the front tires because they are not subjected to as great a strain as the rear wheels.

Speaking generally, intending purchasers would do well to give their first consideration to the tires to be used, because if they take this up later, after they have decided upon the truck, they might possibly be influenced, and it surely would be better to make the decision on the merits of various tires as they are able to find them by reference to others who have used them. If more thoughtful consideration is given to this subject in the beginning the cost of keeping tires on trucks ought to be materially reduced.—Kelly-Springfield Tire Co., E. S. Roberts, manager.

Mileage Guarantees Increased 4,000 Miles in 2 Years

NEW YORK CITY.—Conclusive evidence that tire manufacturers have made remarkable progress in the development of the solid tire, is to be found in the fact that within the past 2 years, mileage guarantees have been increased from 6000 to 10,000 miles.

Our new standard demountable motor truck tire is sold under a flat guarantee of 10,000 miles, irrespective of the city or locality in which it is to be used. This tire is of steel base construction. In a few isolated cases where certain especially aggravated conditions were found to exist, it has been necessary to reduce the 10,000-mile guarantee covering this tire. However, such cases are so rare that United States solid tires may be said to carry a universal distance guarantee of 10,000 miles.

Up to a comparatively short time ago, guarantees varied in different cities and localities according to road conditions, topography and the kind of service in which the truck was engaged. With the advent of the steel base tire, at least in our own case, we have disregarded such conditions and our guarantee of 10,000 miles is good anywhere.

An interesting fact in connection with tire manufacturers' mileage guarantee is that it is valuable only in fixing a maximum of tire cost. The minimum maintenance costs rests almost entirely with the operator. Simply because the manufacturer guarantees his tires for 8000 or 10,000 miles is no reason why, with careful handling, they should not yield a greater service, the length of the service depending upon the load, the speed at which the truck is driven and the character of the highways that must be traveled. All of these conditions can be regulated by the operator. Looking at the tire question in this light, it will be seen that an owners' maintenance cost is largely what he makes it.

The very nature of the service to which solid tires are subjected, exposes them to a great many unavoidable deteriorating influences. It is possible, however, for the operator to minimize these influences by looking after his tires in a careful and thoroughly systematic manner, eliminating abuses which are certain to shorten tire life. A few of these abuses are overloading, speeding, careless driving, violent application of the brakes, allowing the truck to stand under load over night or perhaps longer, permitting the tires to stand in oil, running in and out of street car tracks and deep ruts, and rounding corners at high speed.

It is important that every business man using motor trucks in his delivery system should keep a careful, systematic record of the work done by them, and the expense of their operation. In this way, and in this way only, is he in a position to know what each detail of his truck equipment is costing him. And if he finds that he is not getting the mileage out of his tires his business judgment tells him he should get, he may discover upon investigation, that the men operating his trucks are more or less at fault.—United States Tire Company.

Trucks Should Carry An Emergency Tire

Chicago, Ill.—Unquestionably the most efficient means by which a truck owner or driver can increase the mileage of his tires is not to delay needed repairs. A solid rubber tire should end its life of utility through "old age"—actual wear-out only. It is wonderful what an amount of abuse a rubber tire will stand, and what amount of alterations and repairs can be made without altering its identity, and how its full utility can be restored or maintained by such repairs. And, if such repairs are made promptly, when the first indication of damage appears, the tire, if repaired and re-repaired, will give practically the same service as it would have given had it not met with the mishaps which made the repairs necessary. But the repairs must be made promptly and efficiently, otherwise the injury increases and is soon irremediable and the tire is soon destroyed. A number of circumstances, as a rule, prevent the truck owner from making such needed repairs in time. These are, principally, the delay caused by making such repairs which defeats the very purpose of the truck; that is, loss of service, consequently loss of schedule, irate customers, etc.

Frequently, and in the nature of things generally, the truck tire becomes disabled when the truck is loaded with goods to be delivered, and often this happens during a trip which must be completed at once. There is no alternative for the driver in the latter situation; he must ride on the rims if immediate delivery be required, or, if delay be permissible, summon help, which will consist of the transferring of the load to another truck or wagon, causing great delay and expense. If he rides on the rims, having a heavy load, the rims will be destroyed and the transfer of the load, as said before, will be a great expense and occasion delay, which may be intolerable to the customer.

The useless tire, however, may be quickly replaced if the truck be properly equipped by the emergency tire, and without any expense or delay, or the ruination of rims or tires, the truck may proceed to its destination. Prompt delivery is thus insured, expense of relief trucks eliminated, tires and rims saved from untimely destruction, and the emergency tire may be removed and replaced by repaired or new permanent tires, in the owner's shop, without loss of time to the truck, the driver, or the customer.

From these considerations, and many others which the experienced owner will readily call to mind, it becomes obvious that an emergency tire should always be in readiness to take the place of the disabled or defected permanent tire when the disability or defect first becomes apparent; and that by the use of such an emergency tire the permanent tires, in receiving prompt and efficient repairs, make their full mileage. By the use of an emergency tire the truck is kept constantly in service, the wages of its driver are paid with value received, schedules are kept, promised deliveries effected, the mileage of the permanent tire is increased to its maximum, and the good will and trade of the truck owner's customers are retained.

The guarantee of mileage for our solid rubber emergency tire is practically the same as that of the permanent solid rubber tires which it is designed to replace in case of disability. It is of the same size and of the same compound. Each emergency tire carries its own powerful stretching apparatus in the shape of a joining turn-buckle, and can be made a permanent tire if so desired by cementing it in the channel and vulcanizing over night at the point of union.

The size or weight of the emergency tire required for any given car, for either front or rear wheels, is determined by the size or weight of the permanent tire which it is designed to replace. These tires are furnished of the exact size as that of the permanent tire to be replaced, and of the same compound if desired.

If a truck is equipped with pneumatic tires, the solid rubber emergency tire is made to fit the rim or channel between the beads, but it is not as thick, and consequently will not carry the wheel as high as the inflated tire which it replaces. The difference in size, however, between the pneumatic and the emergency tire makes no difference in the practical operation of the car; because of the differential gear, the difference in level is not noticeable, and with 3 pneumatics on the other wheels the car rides practically as easily as with 4 pneumatics.

In addition to the value of the emergency tire as a means of economy in tire and rim wear too great emphasis cannot be placed upon its value as a time saver. When the disabled permanent tire is removed the emergency tire can be fitted and secured within two minutes at the outside. Its use means the end of road-side repair, riding on bare rims, transferred loads, loss of schedule, good will and trade. —The American Automobile Specialty Co., M. Van Meter, president and treasurer.

Do Not Overrun or Overspeed

Springfield, O.—Our net mileage guarantee on truck tires is 5000 miles, which is the equivalent of 10,000 miles on the list.

In regard to improving tire mileage: Our suggestions and requirements are very simple, and that is, do not load the truck beyond its carrying capacity, do not run it beyond its rated speed and do not use tires too small or above our rate of capacity. If these conditions are complied with we will guarantee to give any one satisfactory mileage over the ordinary streets of our cities and on reasonably good roads, such as prevail throughout most of the sections of this part of the country.

We do not make different conditions for front and rear wheels. We appreciate there is some difference in the service but to simplify matters we make no difference in the conditions as to whether the tires are used on the front wheels or rear wheels.—The Victor Rubber Co., H. H. Dunn, President.

10,000 Miles Guaranteed Under Conditions.

NEW YORK.—We guarantee our tires to give 10,000 miles service within a period of twelve months from date of delivery when used under fair road conditions, provided that the tires are not required at any time to carry a greater load than the maximum for each size, as specified in our catalog; that proper mileage records of the daily running of the trucks be kept by the owner in books which we will provide and copy of such records sent us weekly; that any tires returned for allowance do not show excessive wear from running on or following car tracks, or other evidence of abuse; that tires on which an allowance is claimed be returned to us, all charges prepaid.

We agree to replace any tires that fail to complete the guaranteed mileage and to allow pro rata for the difference between the actual mileage run and the mileage guaranteed.

Our mileage guarantees are made with regard to the weights carried. Best results are obtained from tires of sufficient size for loads.—Polack Tire Co., A. Hauschild, Vice-President.

It is customary in New York to guarantee truck tires 8,000 miles, providing the specific load is not exceeded. In Indianapolis, Ind., Washington, D. C., and some other cities tire wear is better than in New York but in Baltimore several tire makers have been compelled to cut down the 8,000-mile guarantee due to poor pavements, largely of the cobble-stone variety. The Swinehart company has an 8,000-mile guarantee and, taking the country as a whole, the average mileage obtained is 7,500.

Goodyear has a guarantee of 8,000 miles on its individual block tire and 10,000 miles on the demountable tire. All its other solid tires have 8,000 miles. The United States Tire Co. also has 8,000 miles on Hartfords, and Morgan & Wright, any size, gasoline or electric, with the same stipulations as to load. Its standard metal base solid tires carry a 10,000-mile guarantee.

Firestone has a somewhat different system in vogue in New York, but it averages about 8,000 miles. Its guarantee table is as follows:

	Months
Not to exceed 25 miles per day	12
Not to exceed 25 to 35 miles per day	10
Not to exceed 35 to 50 miles per day	7
Not to exceed 50 to 75 miles per day	4
Not to exceed 75 to 100 miles per day	3

It has been generally found in New York that electrics wear longer than gasoline car tires, for the reason that the gasoline cars go faster. The Ward Bread Co., of New York, which concern has 230 electrics, states that none of its tires is worn out as yet, and some of them have run as high as 6,000 miles already. The maker of the tires which it uses gives a guarantee of 6,000 miles. Its electrics are of the 1,100-pound class and the tires are 2½ inches.

The General Vehicle Co. has compiled some interesting figures on tire mileage for trucks of different capacity, as well as the cost per year for tires and the percentage of the total operating cost of the truck which belongs to the tires. The following are figures covering this question:

Capacity	Mileage	Cost per year	Total Percentage of Operative cost
700-pound	10,620	$129.50	6.85
1,000-pound	10,500	145.60	7.06
2,000-pound	10,140	216.30	9.41
2 -ton	9,300	286.00	10.80
3½-ton	8,310	443.80	14.31
5 -ton	7,200	618.80	17.77

There were no tires used in Baltimore last year that gave more than 4,000 miles of service. This was the average wear, and this was due to the poor condition of the streets and the fact that the truck owners persisted in overloading the trucks. Fixed-on tires were the standard last year in Baltimore at which time the demountable tires were an unknown quantity.

Because of the poor condition of streets of Baltimore most drivers use the street car tracks quite frequently for smooth driving, and the sharp edges of the car tracks are a big factor in cutting into both the dual and single tires and acting against their wearing capacity. When the trucks are run off the car tracks the cobblestones and gutters are so arranged that the inner tire of the dual tires get the bulk of the wear, while the outer tire hangs over the gutters. As to the front single tires, the strain is just as heavy on them.

In the suburbs of Baltimore, however, the owners as a rule get good wear out of the tires and as a rule these tires made the average mileage as guaranteed by the tire companies. This mileage guarantee last year was the same both for city and suburbs and was from 6,500 to 7,000 miles. This mileage guarantee, however, never was fulfilled in the city. This proved conclusively in the minds of the tire companies that the streets of Baltimore and the fact that the owners over-loaded the trucks were factors in injuring the tires and preventing them from making the mileage guaranteed. This pertains to every make of truck used in Baltimore and every make of tire used on motor trucks in this city.

This year the truck manufacturers realized that in view of the over-loading of trucks by the truck owners that they would be obliged to put on larger tires and this has been done. As a result the tire manufacturers have raised the guarantee on demountable tires in both the city and suburbs to 10,000 miles. The tires under this guarantee are holding up exceptionally well and this proves to the tire manufacturers that the over-loading and street conditions were the features that acted against the fixed-on tires last year. Last year the demountable tires were practically unknown here and all tires used were of the fixed-on type. This year the value of the demountable feature has been brought to bear on the truck owners and truck manufacturers and consequently the demontables have become the standard type, although there are still some of the fixed-on type in service. But these fixed-on type tires have only the same guarantee as last year and are not giving any better service than last year.

Factors Are Weight of Load and Driving Speed

Mr. Blair, who has charge of the Packard trucks handled by the Mar-Del Co., of Baltimore, says that the streets driven over within the city limits, the weight of the load and the driving speed of trucks are factors which the tire companies considered in giving mileage guarantee on tires. He says that most of his experience with tires has been on the 3-ton truck and that the guarantee on these tires runs from 8,000 to 10,000 miles as allowed by the United States Tire Co. This tire company allows 10,000 miles guarantee, both within the city limits and in the suburbs on the 36 by 5-inch dual tires and only 8,000 miles on tires of lesser size. The regular tire equipment of the Packard 3-ton trucks are the 36 by 4-inch dual tires on the rear, on which only an 8,000-mile guarantee is given, and 34 by 4-inch single tires on the front wheels. Trucks may also be equipped with 36 by 5-inch tires, thus giving owners an extra 2,000 miles of guarantee.

Modern Construction

Dead Axle in Rectangular or Square Secti Leads in Point of Numbers—T —In Worm-Driven Ax

Most motor trucks at present on the market have drive by mounted above the axle with shackles at both ends, an springs are usually outside the frame. Hea

Packers Rear Axle and Spring Design on Trucks

Packard Spring Attachment on All Truck Models

White Underslung Spring Design and Radius Rod Construction

G. M. C. Truck with Very Low Frame Support

Sampson Spring Mounted Over Cylindrical Axle

PRESENT tendencies in rear axle and spring construction point rather toward the use of the dead axle in rectangular or square section and semi-elliptical springs as standard practice. The drive is by side chains from a jackshaft in the majority of vehicles now on the market, with shaft-drive second in point of numbers, single center chain third and worm-drive fourth. In the ranks of the side-chain drive advocates there is little variety in the construction of the axle proper; for the heavy trucks, for example, the axles are uniformly straight with the brake-carrying construction and spindle at the ends, and the springs attached to pads which in their turn are fitted to the axle by bolts, etc. In the shaft drive ranks, where a live rear axle is employed, the chief diversity lies in the de Dion and Mais double axle constructions, where the load is carried on one portion of the axle and the drive is transmitted through the other portion. The single-center chain drive is found on the lighter delivery wagons and the live-axle construction differs very little from that of the pleasure automobile of corresponding drive. The worm-drive with live axle has added to its ranks and a number of the constructions are most ingenious.

Advantages of Elliptic and Platform Springs

While the semi-elliptical spring leads in point of numbers, the platform type is excellently represented in practically all the range of delivery from the 600-pound wagon up to the 5-ton truck. The elliptic is fitted for the most part to the light and medium delivery wagons, while modifications, such as the three-quarter platform, one-half platform, etc., are represented only. The same may be said of the three-quarter elliptic.

The square or rectangular section rear axle follows the general lines mentioned above, the differences in construction being largely in the axle attachments. Radius rods are fitted in the same vertical plane as the drive chains in most cases, but this fitting is by no means invariable, as the rods are carried to the jackshaft casing from a bearing inside of the frame line on the White and Speedwell trucks. In the former a circular seat is machined on the axle and a big-end at the rear of the radius rod fits over the seat. A similar big-end works over a seat on the jackshaft casing. On the Speedwell the front end of the rod is pivoted in a clevis formed integrally with a collar which works on the outside of the jackshaft casing.

The circular-section axle, usually tubular in the light vehicles and solid in the trucks, has the wheel spindle and brake-carrying construction welded on, thus making a three to five-piece job, on the tubular axles. On the solid axles the spindles are usually in one with the axle itself. The form necessitates separate spring pads in addition to the yoke-bolts and these are in a number of cases arranged to carry the rear part of the radius rod, as in the Sampson truck. In the Rapid 5-ton truck an arm on the radius rod serves as a brake support, while the spring pad is curved

ear Axle and Spring

erally Used — Semi-Elliptical Spring
:form Type Is Well Represented
ersity Is Most Marked

s from jack-shaft. The semi-elliptical spring is generally
ackets placed below the frame. On light wagons, side
: have pads fitted above and below the springs.

and is integral with a collar fitting over the axle. The yokes go over this collar and bolt in a plate as in general underslung spring construction. The collar is fastened to the axle by a pinch-screw. On the Knox axle the pad and radius rod carrier are integral, the latter being formed for a ball-and-socket joint at the rod rear end.

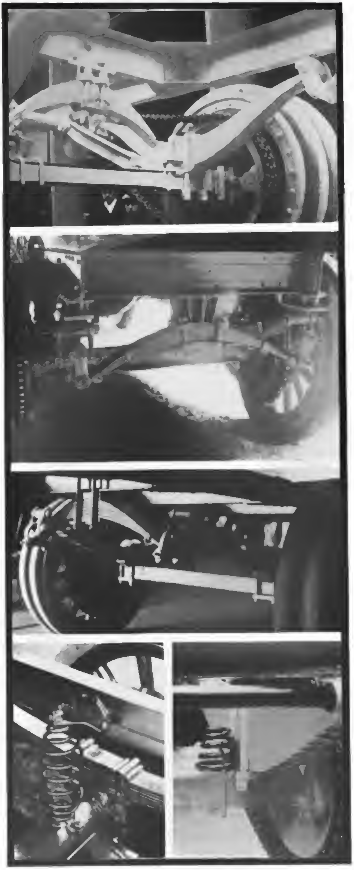
For the most part the shaft-driven live axles follow pleasure car lines, but are, of course, strengthened for commercial service requirements. The differential casing halves are usually welded into the inner ends of the axle tube. In the Autocar the casing carries a reduction gear in addition to the bevel drive gears. The spring pads in such constructions are fitted to the ends of the axle tubes. Generally speaking, the live axle, whether shaft or chain driven, is strutted by rods below and yokes are used for retaining the springs. In the de Dion truck the load-carrying axle is tubular and is in the rear of the construction. The differential casing is frame-suspended and drive to each wheel is by cardan shaft with spur gear reduction, the wheel carrying the internal gear and the block the pinion. On the Mais the construction is somewhat similar, but the driving members are carried in a live axle casing forming a compound axle, the rear member carrying the load. The pinion is in the axle end block and the gear on the wheel.

It is in the worm-drive axles that the diversity is most marked. In the Pierce the axle casing carries both differential and live shafts and is heavily ribbed radially. The radius rods are channel section and have clevis rear ends which work over lugs on collars on the axle casing. A torque rod allowing horizontal motion only in addition to taking the reaction is attached to a bearing at the centre of the casing. The worm is carried in ball bearings in the upper portion of the casing which bolts down the lower or axle portion and the worm shaft is fitted with a universal joint at its forward end. Radius and torque rods are inside the frame.

On the Newark truck, the tapered axle-casing halves are bolted to the cylindrical differential casing whose upper half forms another cylinder at right angles in which is carried the worm. End plates in this worm cylinder permit of access, etc. The cylinder is flanged forward to take the torque-tube which surrounds the drive shaft. Both brakes act on the rear hubs in this truck.

Accessible Worm Driven Construction

Accessibility with unit construction is seen in the Smith worm-driven construction. The differential casing is open at the rear and top and the worm, worm-wheel and differential are mounted in a unit frame which fits within the casing. The live shafts have hexagon ends and fit into similarly formed apertures in the differential. The whole unit can be lifted out of the casing by withdrawing the live shafts, removing the cover and horizontal bolts and attaching a rope to the curved arm at the top of the unit.



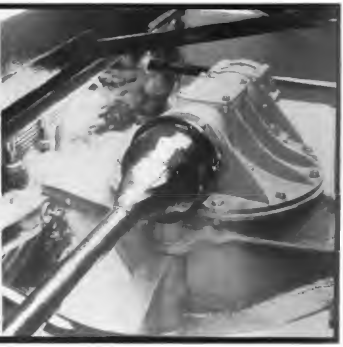
Speedwell Rear Spring Suspension with Auxiliary Spring

Eclipse Platform System in the Rear

Grabowsky Auxiliary Rear Spring Suspension

Lippard-Stewart Auxiliary—Peerless Auxiliary

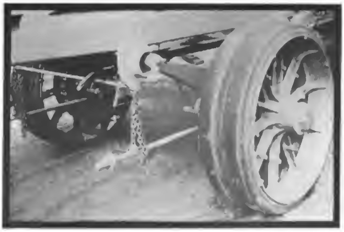
Unit of Worm and Wheel in Smith's Truck Rear Axle



Standard Worm-Driven Design of Pierce-Arrow Rear Axle

Worm-Driven Newark Rear Axle

Probably the most unique rear construction is that on the Bussing truck. The radius rods are pivoted to special curved brackets at their forward ends and are fitted with powerful volute springs, which are stated to take up any shock due to a sudden clutch application. The rods are tubular and oscillate at their rear ends on pins which are pinch-held in D-shaped brackets integral with the square rear axle. The spring seats have fairly long vertical projections to right and left of the spring sides and the yokes are fitted with flanges which enclose these projections. The retaining bolts are thus very short.



Locomobile Rear Spring Attachment and Spring

On the Duryea wagon, the axle is at the rear of a rectangular frame which is spring-pivoted forward to the main frame and on which is mounted the power-plant and drive mechanism. A single reversed elliptical spring suspends the whole at the rear. The axle is of channel section and the wheels carry two sets of roller pulleys, attached to the spokes, small roller pinions on the drive shafts serving to give the speed reductions. Typical buggy wheels with solid tires are used on this wagon.

Mounting the Semi-Elliptical Spring

General practice in mounting the semi-elliptical spring is above the axle with shackles at both ends, carried by recurved brackets below the frame. In constructions like the English Commer the front shackle pivots on a bracket which also forms the bearing for the sprocket end of the jackshaft, but the springs are outside. On the heavier trucks, pads are fitted both above and below the springs at the point of clamping to the axle, as in the Lozier. Where the springs are fitted below the axle, Hewitt and White trucks, the axle pads are formed with lips to prevent turning. The Hewitt 10-ton springs have a deep curve and contain 25 leaves each; the yokes are reversed with the nuts at the top and a third axle pad with lips is fitted. The spring ends play in triangular brackets mounted below the side members. On the White, the nuts are below and the axle pads are lipped and grooved. The rear spring bracket is flanged and drilled, the shackle being nearly vertical, while the front shackle is suspended above and swings to and fro under the spring movement. Sliding motion for the ends of underslung springs is also allowed for on the Rapid 3-ton truck, downwardly-projecting horn-plates enclosing the sides of the spring ends.

On the lighter wagons, fitted with platform springs, the side springs are outside the frame, and the transverse re-

Underslung Rear Spring on Hewitt

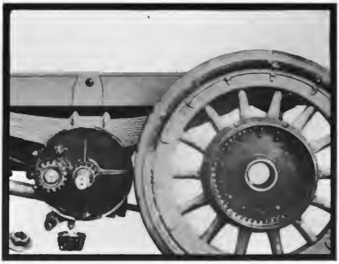
versed semi-elliptical spring is attached to the rear frame member, as in the Autocar. The ends of the transverse spring carry shackles which attach to others at right angles on the rear ends of the side springs. The transverse spring shackles set inclined inwardly when no load is on the vehicle, assuming a vertical position when the load is on. The heavier vehicles, as the Grabowsky, Eclipse and Dayton, carry the side springs under the frame side members. On the first of these, a ribbed spring-carrier with curved seat is fitted below the rear cross member and the transverse spring is bolted to this. The shackles are built-up, having the barrels in one piece and the side links separate. At the front ends of the side springs swinging shackles are fitted, the centre being on the frame. Shock pads, similar in construction to that of the transverse spring carried, strike the shackles at the rear and thus assist in forcing up the body, etc. On the Dayton, a carrier is fitted below the cross member but the bolts are carried above the frame member before fastening. On the Eclipse, the rear shackle of each side spring is also inclined, and the load effects a vertical position of both sets of shackles.

Elliptic springs are generally mounted outside of the frame. In the case of the Morgan truck, they have an inclination forward; that is, the retaining yokes are not in the same vertical line. This inclination is designed, apparently, so that under the influence of the live load and the driving impulses, the axle will move forward, or the spring upper member backward, and the spring assume an upright position. The upper attachment is to the side member of the frame by a short bracket, or by a goose-neck as in the Koehler wagon, while the lower member is clipped to the axle as in the case of the semi-elliptical spring.

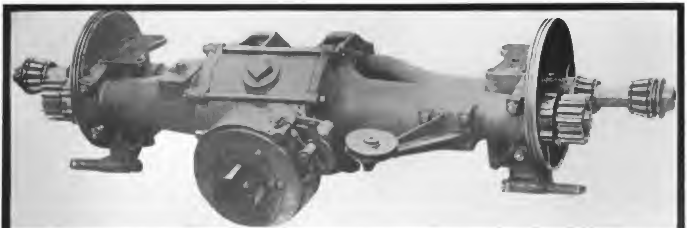
Use of Auxiliary Springs

Auxiliary or helper springs are fitted to a number of the heavier vehicles, their function being to take up any shock of the body on the running gear or vice versa. The general practice in this direction is to employ a reversed semi-elliptical spring fastened to a cross-member of the main frame and with the ends flattened and free. Below the ends are seats or pads variously placed. On the Speedwell and Lozier, the pads are on the rear axle inside of the spring pads, the helper spring being carried from a casting bolted to the frame cross-member.

In the electric truck, drive being chiefly by side chain or by gearing in some of the lighter constructions, the I-beam axle is the most numerous, with the tubular axle second as regards the lighter wagons. The forgings for both front and rear axles on a number of electrics are similar, with the differences due to the employment of pivots, etc., in the front and spindles and brake rigging in the rear axle. Thus, an I-beam front axle in many cases is seen with an I-beam rear axle. An exception is the Detroit, where the rear axle is rectangular for an I-beam front axle, and the General 2000-pound wagon, with a square front and circular rear axle.



Spur Gear Drive in Mais Rear Axle



Combination Live and Stationary Axle of Mais Truck

Commercial Car Questions Discussed

Is Truck Insurance Correctly Rated?

NEW YORK CITY.—The various forms of insurance, fire, theft, accident, life, etc., are based on records which give a pretty sure indication of how much premium must be charged on each individual risk in order to meet the probable losses and provide a suitable margin in addition. There are several elements of risk in connection with motor vehicles—fire, theft, damage to car itself through collision, damage to the property of others and legal risk attaching to the owner for personal injury of others. When automobiles first came into general use there were, of course, no proven figures on how high the premiums would have to be to warrant an insurance company assuming these various risks. Now that self-propelling trucks and commercial vehicles are being used extensively, a similar question arises, but it does seem apparent that, if the premiums which for several years have been charged on passenger vehicles have proven ample, the premiums for commercial vehicles should be made proportionately lower. The fact is that many owners of passenger automobiles consider the insurance rates much higher than they should be, and in any event they take either all risks or part of them themselves; in other words, they either carry no insurance whatever or only a partial line. This means that the insurance companies are operating within narrower limits and with a smaller number of patrons than they would have under lower rates. To be sure, their risks are reduced in some proportion, but not, in my opinion, in exact proportion, because, under prevailing conditions, they are more likely to secure the rates they ask only from such owners as feel that they are particularly in need of insurance. This leaves the companies operating only among the most precarious risks, while the owner maintaining his machine in, for instance, the suburbs and in his own private garage does not so readily pay the $200 or $300 per year necessary for a full line of insurance. It would seem that something is wrong with the methods of rating that produce this result and that a way should be found to classify risks and adjust premiums on a basis differing from the one in use. An opportunity is offered in the case of trucks, where the risk on the part of the insurance company is certainly less in every way. There is little or no danger of theft and there is not the opportunity in the case of fire or collision for expensive repairs when the damage is partial. The body finish and upholstery of a passenger machine are risks which are not present in the case of trucks. The speed at which the latter are operated renders them less liable to collision with other vehicles or objects, or injury to persons. The disastrous results liable to attend excessive speeding do not have to be considered with trucks. It has been said that damage to the property of others is as great, or greater, in the case of trucks than it is with passenger machines, owing to the greater weight and consequent opportunity for more extensive damage when a truck strikes anything, but it would seem that, while there may be some basis for such an argument, it should be overcome by the reduced average speed of a truck, which would tend to make collisions less frequent than in the case of faster moving vehicles.

Your understanding that this subject is just now having the attention of the National Association of Automobile Manufacturers, Inc., is correct, and we hope to bring about some improvements in this matter of adjusting rates for insurance of trucks.—J. S. Marvin, Assistant General Manager.

After careful consideration of these many differences between the conditions surrounding pleasure-car operation and those incident to truck operation, it can very logically and correctly be deduced that those insurance rates based on an estimate of the performance of automobiles should most certainly not be used as a basis for fixing the premiums paid with respect to the insurance of trucks. It seems essential that some different course should be adopted in such an important matter, one so visably affecting the present and future position of the motor truck industry.

False Impression of Seattle Streets

SEATTLE, WASH.—There seems to be an impression abroad that owing to the nature of its street pavements this city is hard on solid rubber tires and that truck owners do not get as much mileage on their trucks here as they do in other cities. This conception of Seattle is entirely false. There is not a square foot of cobblestone pavement in the city and to my positive knowledge the streets of Seattle are the best paved ones in this territory. There are cobblestone pavements in San Francisco. Most of the heavy traffic streets of Seattle are paved with vitrified brick or block sandstone or asphalt. I have driven a car over the principal streets of San Francisco, Los Angeles, Oakland, Sacramento, Tacoma, Vancouver and Seattle and in my judgment the pavements of Seattle are, by far, much superior to those of the other cities mentioned.—F. M. Fretwell, Secretary Automobile Club of Seattle.

The Small Dealer is Waiting for Trucks

Editor, Commercial Vehicle—The article in your issue for July entitled "Selling Motor Vehicles on Credit" is certainly timely and many of us smaller dealers and merchants who realize what an advantage a motor delivery would be in our field are waiting anxiously for the day when we can purchase a good reliable vehicle on such terms as are mentioned.

To dig down and shell out $1,500 from a business operated on a weekly credit system is a job too hard to tackle as a business proposition, and yet there are many of us who could put down our $200 per as payments toward a working motor truck, and would if we had the chance.

In my opinion there should be a machine on the market of 1000 pound capacity, capable of a 15 to 18 mile speed on pneumatic tires and selling at not over $1,200, built to fill the field of the small dealer. Perhaps there is such a machine, but if so news of its being has not reached these parts.

This machine should be sold for $200 cash and $200 per month until paid for, the amount being secured to the dealer by a chattel mortgage and insurance on the car. The truck payments would thus be insured to the dealer, while we of the small store would be able to put our $200 per month to work immediately instead of letting it lie idle in the bank at 3 per cent until the entire amount was saved. Motor trucks are bound to come and we the Small Dealer are but waiting to fall into line with Progress—when we are able to finance it.—Retailer, Detroit, Mich

Keeping Dust and Grit from Driving Chains

Editor, Commercial Vehicle—As my truck travels most of the time over dusty roads I have considerable trouble with the dust and grit which collects in the lubricant on the driving chains. I have tried cleaning them with soap and water, a method which was recommended to me, and with gasoline, but without much success. Could you give me any information as to the best way to clean them and to keep them clean?—B. W., Kansas City, Mo.

If you will carry out the following directions once a month you should have no further trouble of this character. Driving chains require care, just as any other part of a truck requires care, but if the work is done regularly it will be much easier and much better for the truck. There is a removable link in each chain which is fastened in place by screws or cotter pins. Loosening this link permits of the removal of the chain which should then be placed in a vessel containing sufficient gasoline or kerosene to completely cover the chain. It should be left there for several hours, overnight if possible, so that the grit and grease may be entirely cut away. Lifting the chain by the ends, it should be ru back and forth through the gasoline a number of times. This will wash off any particles which may be clinging to the links. The chain is then hung up to dry, after which it should be placed in a vessel of good machine oil and moved about, allowing the oil to work in around the pins. Graphite or some grease should then be applied to retain the oil and to prevent, as much as possible, the entrance of dust and grit into the parts. The main task in cleaning a chain is to first get the dust and dirt out of the link eyes and around the chain pins, then get the oil in and lastly get the grease on to keep the dust and dirt out.

Arguments for Credit Selling

Editor, Commercial Vehicle—I read with special interest your articles in the July COMMERCIAL VEHICLE on purchasing motor vehicles on some form of credit system, and am much in favor of this for small vehicles selling at not more than $1,000. In many small retail businesses it is quite impossible to pay out at one time this amount for a motor vehicle and particularly is this so when it is difficult to realize much on the old horse equipment. I am in favor of a stout, light, robust commercial vehicle to sell at $1,000. This vehicle must have pneumatic tires. It must be better made than many of the blacksmith shop cheap car jobs that have been put on the market. It must be a reliable little vehicle, with a speed of 12 miles per hour. This is fast enough for the retail grocer and a score of other retail business firms. Too much speed will kill any rational commercial vehicle.

This vehicle could easily be sold on a credit system. It could be handled on a basis of $200 cash and the remainder in monthly installments of $200 each. In this way the truck maker would get all of his pay in 4 months. It might be possible to pay $100 a month for 8 months. The $200 cash payment could nearly be obtained from disposing of the horse euipment, so that investing in the motor vehicle would not be such a problem as it is at present.

Until he gets his complete money the truck maker must be protected, and it would be proper that he insist on the buyer taking out an insurance policy before the vehicle was delivered covering its value. This policy would be turned over to the truck dealer as protection in case the vehicle was destroyed or stolen before finally paid for. As soon as the vehicle is paid for the insurance policy would have to be turned over to the vehicle owner. But it is only natural that the truck maker or dealer would go further in his own protection and require a chattel mortgage on the vehicle. This together with insurance would give him all of the protection he should need.

The truck dealer and maker may look askance at this credit scheme when first examined, but it will stand close and continued examination. If the truck is well made it will stand up and give every satisfaction in the 8 or 10 months before it is paid for, so that the truck dealer would not have any trouble due to the machine coming back on his hands because of unsuccessful operation. The company building a poor vehicle would have a white elephant on its hands in such a sale and properly so. There will be a few cases in which the vehicles will revert to the dealer and to the truck maker. In such cases the depreciation in the vehicle while in use will be more than covered by the cash payment and the monthly payments received. The truck dealer will have to take back some machines, give them a little overhauling and do some repainting. With such attention it will not be difficult to more than realize on the machine as a second-hand vehicle.

I would suggest one other feature of credit selling, and that no truck or delivery wagon buyer be permitted to put a driver on who has not reported to the dealer and spent some few days in his employ in a brief educational course. If the dealer gets hold of each driver he is certain in a few days to get instilled into him some guiding principles. It will protect the truck dealer against having his machines perhaps seriously injured by ignorant and careless drivers. It will also be a sure and certain way of impressing on truck buyers the all-important question of the driver.

There is still a further essential in this credit selling argument, namely, that the truck dealer should insist on the buyer consenting in writing to have his vehicle examined and overhauled periodically. The buyer should report once every fortnight with his machine for a cursory examination to see if everything is working well. In this way troubles can be discovered in their infancy and the cost of upkeep be kept down accordingly. Such a free inspection system, for it should be free, would be an admirable bond between the truck dealer and the buyer. Both would keep in close touch with the work of the vehicle, and it is certain that with such co-operation there would be very few cases of motor vehicles coming back on the hands of the truck dealer before the last payment was made.—*Grocer, Milwaukee, Wis.*

A Motor Truck for a Meat Business

Editor, Commercial Vehicle—Engaged in the meat business running a small market with horse delivery I am considering the purchase of a motor delivery wagon. This would be a help to my business but could I make it pay with so many stops and a haul of not over 4 miles? What type of body would be best suited to the work? What size of machine would I want? I now have 2 1-horse wagons running all the time.—Market, Chicago, Ill.

Whether you can make a motor truck or delivery wagon pay in your line of delivery depends on many things not mentioned in your inquiry, but if you have a business sufficient to keep 2 wagons going making say 2 deliveries a day there should be a possibility with 1 motor delivery wagon of making 3 or even 4 deliveries over the same territory in the same time as is being done with 2 1-horse wagons. The gain in service would possibly bring increased business enlarging the territory over which you are now selling goods and thus benefit even though it cost a trifle more than horses. When you figure that with a 1-horse wagon and driver at about $5 per day making 15 miles a day the cost per mile is 33⅓ cents it is easy to see how a motor delivery wagon can be made to pay on a possible mileage of 40 per day and a cost of $10 for 10 hours' work 25 cents a mile carrying two times the load of a 1-horse wagon. If the mileage is hindered by stops this showing cannot be made, hence the importance of stops as hinted at in your question.

Though the haul at the start would be 4 miles, as you say, this would probably increase as your territory widened with truck use. The matter of body design in your work would be important on account of stops. If 1 minute were saved by body arrangement in the delivery of each package on a route of 40 customers, the 40 minutes saved in a run would make 2 hours and 40 minutes a day saved on a four-run route—enough to make up for an extra trip with the same truck, or a run on another route. The fact of putting a boy on a wagon to save a minute at a stop has saved many a delivery system.

Fit a body therefore arranged so that the bundles can be reached from the seat by the driver or helper, that he may have the bundle in hand and be out the minute the machine stops without having to walk to the rear, unlock a door and fish for a bundle in a promiscuous pile. Arrange the bundles systematically. The body which makes for the least delay will give the best results. Just what this is you will have to figure for your particular case.

From the data given it would seem that a speedy 1,500-pound machine on pneumatic tires would be very suitable and worth looking into.

Service a Basis of Grocery Competition

Detroit, Mich.—Will the universal adoption of the motor truck as a delivery vehicle mean the eventual elimination of the corner grocery?

Will service and price competition do away with the grocer whose trade is not large enough to finance motor equipment and operation?

Will the grocer who is but barely able to purchase a motor delivery vehicle be able to make it pay after he buys it?

These are vital questions and the answers limit the future of many a grocer who should wake up to the fact that he is approaching a new order of things and must plan ahead accordingly.

Grocery competition, among many other lines of trade, is based on two things: price and service. Price is important but service equally so. If a downtown grocery can furnish service equal to the store across the way, with equal prices but delivering with a motor wagon instead of a horse rig, the downtown store will get the big orders from the modern housewife, who likes to trade in up-to-date fashion with up-to-date stores. Many downtown stores in various cities cover the whole city field with as many deliveries per day as do the small local groceries in their own territory, and even shade prices a trifle.

These large firms have business enough to keep motor vehicles in operation all the time and hence can make them pay. They have money enough also to handle the first investment. The corner store may not have money at hand to buy a truck, and if it has may not have enough delivery business to keep the machine busy after it is purchased. This will mean delivery at a loss which must be added to prices, so that in the end the corner store has gained nothing by adding trucks. The only solution is for it to add on territory and extend trade until the truck is kept busy, but by then it is no longer a corner grocery, but a retail center.

The situation is not only interesting but of vital importance to the grocer, and those who see ahead and plan accordingly will reap the reward.

With the eventual adoption of the motor truck as a universal delivery vehicle the corner grocery must grow to something more than a local store or be absorbed, the mere adoption of a motor truck being far from a saving factor if the business be not extended to correspond.—H. S. D.

Loading 5-Ton Truck by Hopper in Coal and Crushed Stone Field

Trucks in Coal Field

Pierce-Arrow Truck Reduces Cost of Coal Hauling 20 Cents Per Ton—White's New Side and Rear Dump Bodies

SPAULDING & SPAULDING, coal merchants of Buffalo, N. Y., have by using a 5-ton Pierce truck been able to reduce the price of handling coal 20 cents per ton, this figure being based on the work of one truck from September 1, 1911, to June 1, 1912. Under the horse system it cost 47.9 cents per ton to handle the coal, and with the motor truck this figure has been reduced to 27.9 cents per ton. The one truck has during that period transported 7916 tons of coal at 27.9 cents per ton, which figure of cost includes 6 per cent on the money invested in purchasing the truck, together with the general insurance on the vehicle, the wages of one driver and one helper, tire maintenance, gasoline, lubricants, repairs and an ample annual allowance for overhauling, together with a broad margin for truck depreciation.

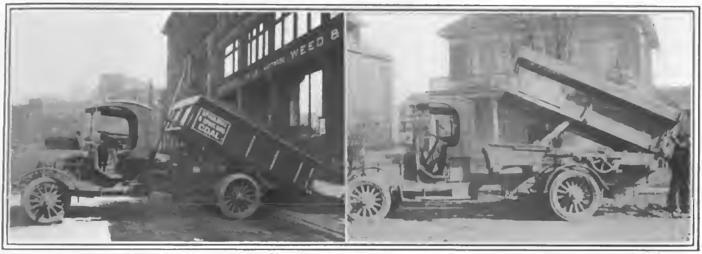
During this period the 5-ton motor truck handled the coal that was previously handled by two two-horse teams and one single-horse vehicle, the truck replacing not fewer than three vehicles.

Within the same period 8093 miles were covered, and one phase of the experience that is of interest is the tire service. It was feared by the owners that this item of expense might be unduly high. Up to date this has not been the case, although mileage allowance was made in the computation of costs, and the tires on June 1 were estimated as being capable of at least 1000 miles more.

One of the biggest factors in the substitution of motor service is the reduction of complaints owing to more prompt delivery than was possible with horse service. Promptness in service is being demanded more each successive season, and increase in business and ability to hold customers largely depend on the speed of the delivery systems. For this reason those dealers who have not adopted motor trucks have naturally felt themselves somewhat handicapped. The result has been a universal awakening of interest in the subject of motor-truck delivery, and any figures on cost and information on availability have been seized upon by dealers who have felt the changed conditions of the last year or two.

A great many dealers who have seriously considered the installation of a fleet of motor trucks have been bothered by the question of comparative costs of delivery per ton. They have found themselves handicapped in making a comparison by reason of the fact that with the motor truck they have been enabled to keep an accurate record, while with their horse-delivery system they had no figures on which they could rely. Spaulding & Spaulding, however, some time before they bought their first motor truck began to keep a careful record of delivery costs and also of complaints on service. They found that the latter were based principally on delays during the winter months when the streets were in bad condition and in other cases when trips were compara-

Two Views of White Truck with 5-Ton Body Designed for Rear Dumping



Pierce-Arrow 5-Ton Coal Trucks with Screw and Combination Dump Body

tively long. A matter that entered into their examination of costs was the gradually increasing price of horses, feed and labor.

[illegible] bodies of the Spaulding trucks are of steel throughout and hold 170 cubic feet, or 5 tons, of coal. These bodies are 10 feet 6 inches long, 6 feet wide and 24 inches high, with 9-inch flares at the sides.

The times for loading are approximately: Hand loading from pile on the ground, 35 minutes; loading from an overhead chute, 5 minutes; loading by link belt conveyor from piles, 12 minutes.

[illegible] dumping are approximately: Rear dump by tilting body, 10 minutes; side discharge from pockets or by shoveling out, 25 minutes.

Spaulding & Spaulding have recently placed an order for twenty-five additional Pierce trucks.

White 5-Ton Dump Bodies.

The White Company has perfected for its 5-ton truck what it designates as a heavy-service dumping body for coal and stone work, which body is designed to dump to the rear or to the side. In many fields of service, particularly on narrow streets, the side dump is imperative because of lack of room to back the truck up to the curb as is needed in a rear-end dump.

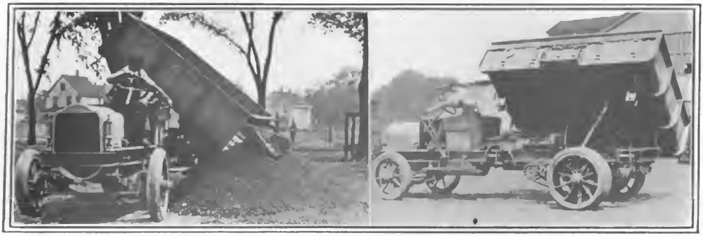
Two sizes of dumping bodies are provided, one for coal and the other for crushed stone and similar materials. For coal the body dimensions are 11 feet 2 inches long, 72 inches wide and 30 inches high; for crushed stone these dimensions are: Length 11 feet 2 inches, width 72 inches and height 18 inches, the last measurement being the only one that differs in the two types.

The length of time required to dump the load either to the side or rear, irrespective of material, is 25 seconds.

The over-all truck dimensions are interesting and are as follows: For the rear dump, 19 feet 5 inches; for side dump, 18 feet.

In truck operation speed in load is as imperative as speed in unloading. Two of the illustrations, those at the head of this article, show the use of the hopper system for loading in both the coal and crushed-stone fields. The time required for each depends on the capacity of the hopper and the means of operating it.

SCHWABACHER BROTHERS COMPANY, Seattle, Wash., wholesale grocers, was one of the first concerns in the city to adopt motor vehicles, starting with a 2-ton G.M.C. truck. After a 6 months' trial it has been found that the motor truck not only increased the efficiency of the service, but effected a saving. For the 6 months the expenses averaged $150 a month; this included driver's wages, garage expense, oil, gas, tire replacements and all other incidentals. During this period the truck carried 1,950,000 pounds of goods. The total cost of delivery per ton was 93 cents and the average price for team deliveries as charged by the transfer companies for making deliveries for the wholesale grocers in the same territory covered by this particular truck is from $1 to $2 per ton. The shipping clerk advises that the average cost per ton for the territory covered by the truck would, by teams, be $1.60 per ton, which is most conservative. This would give the truck credit for a saving of 67 cents per ton, thus bringing about a total saving for the 6 months' service of $633.25.



Two Views of White 5-Ton Truck with Side Dumping Coal Body

Vulcan Trucks and P. & M. Electric

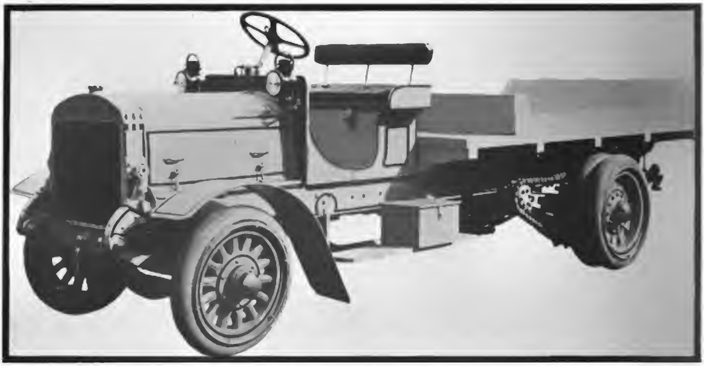


Fig. 1—Vulcan 7-Ton Truck Built by Driggs-Seabury Ordinance Corporation

THE Driggs-Seabury Ordinance Corporation, Sharon, Pa., is manufacturing the Vulcan truck in five different models, with normal and maximum load ratings and prices as follows:

Model.	Normal load, pounds.	Maximum load, pounds.	Chassis price.
First	6,000	7,500	$3,600
Second	8,000	9,200	4,000
Third	9,000	10,330	4,500
Fourth	10,000	11,500	4,750
Fifth	14,000	15,500	5,600

The general lines of design in all models are alike, use being made of a four-cylinder four-cycle motor in all of them. The motor is located under a forward bonnet or hood; the driver sits in rear of it, in pleasure car fashion; the steering pillar is on the right-hand side and control levers are in position for right-hand operation. Side chain driver is used throughout for final power transmission from the jackshaft to the rear wheels.

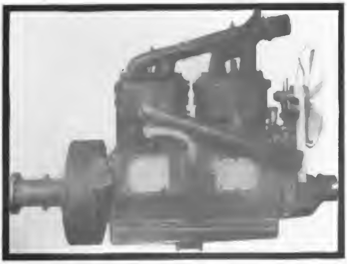


Fig. 2—Motor for Vulcan Trucks

Two sizes of motors are used, the smaller one, 4⅜-inch bore and 5.5-inch stroke, is used on the first four models and on the fifth is a motor of slightly larger bore, 4¾-inch bore and 5.5-inch stroke. The lines of both are illustrated in Figs. 2 and 3, although this is the smaller motor, using as it does thermo-syphon circulation, whereas pump circulation is used in the larger one. Use is made of L-type cylinders so that one cover plate encloses the valve springs for each twin casting. Use is made of a three-point support, a single point in front and two supports in the rear through a separate cross support. The motor outline is simple, confined as it is to the carbureter on the right side and magneto on the left, the magneto being located so that its top is not higher than the top of the crankcase, thereby leaving all of the valve springs accessible.

On the four small models a three-speed sliding gear set is used, whereas a four-speed set is used on the large model.

P. & M. 1-Ton Electric

The P. & M. Electric Vehicle Co., Detroit, Mich., expects to begin deliveries on its 1-ton electric truck within a month. The general design is unique in that the motor is located in front under the seat and drives by shaft to the differential in the jackshaft, the propeller shaft passing between the two battery trays mounted amidship and beneath the chassis frame. With the standard body type the over-all truck length is 158 inches and the over-all width 68 inches. The wheelbase is 112 inches. The weight, equipped with standard body, is 3800 pounds.

The motor of the new truck will be a Westinghouse, type V-50, the voltage being 80 and the amperage 30. The speed of this motor is rated at 1500 revolutions per minute under normal conditions. It is mounted forward, under the seat, the shaft from it to the jackshaft passing back between the

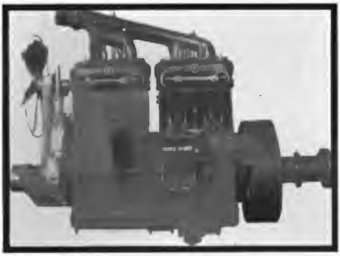


Fig. 3—Motor for Vulcan Trucks

two battery boxes, which are located amidships under the frame. This construction is the same as that employed in the ½-ton truck. The controller, which is also placed under the seat, is of Westinghouse make, type 501-F. It is designed to give continuous torque, there being four speeds forward and two reverse.

The battery is of Gould manufacture, having forty cells, with thirteen T. H. plates per cell. The connectors are of the L type. The mileage per hour with this battery and fully loaded truck is 9 miles, while that on a charge is given as 50 miles, under normal service conditions.

The propeller shaft from the motor is of large proportions. It is of square section, 1¼ inches in size. Two universal joints are used with this shaft, one being placed just to the rear of the motor and the other at the differential. As in the usual construction, two side chains transmit the power from the jackshaft to the rear axles, the gear reduction between sprockets and pinions being 12 to 1.

The jackshaft is of the live type of Weston-Mott make. Ball bearings are used on the third-arms, which are also of this concern's manufacture. On the sprocket ends Hyatt roller bearings are used. The parts of the shaft, differential, brake rods and holders, as well as the battery, are easily reached on removal of the floorboards.

Both axles are of Weston-Mott make, the rear one being of square section of the dead type, 1¾ inches square with spindles 1¾ inches in diameter. Side radius rods of substantial proportions pass from the jackshaft mountings between the service brake drums and the frame members to the rear axle. The front axle is of I-beam section, 2½ by 1½ inches, the spindles having a diameter of 1⅝ inches.

Springs are elliptic, the front being 36 inches in length with a width of 2 inches. In the rear they are 40 inches long and have the same width as the front springs. These rear springs rest on the axle and are fastened to it in the usual way with clips. They are fixed to the frame at their upper sides in special adjusting supports which allow them to slide back and forth to take up jars due to unevenness of the road. At the same time the radius rods at each side maintain the alignment and relative distance between jackshaft and rear axle.

There are two sets of brakes, the emergency and service brakes. The service types expand in drums at the outer ends of the jackshaft between the frame members and the chain sprockets. They measure 10 inches in diameter and have a width of 2 inches. The emergency brakes are also of the expanding type, measure 14 inches by 2 inches and are located in drums mounted on the rear wheels. The operation of both sets is by means of pedals which are located on the floor forward of the steering column.

The frame is of standard 4-inch steel, channel section, having a length of 147 inches and a width of 32 inches. The cross-members, of which there are three, one at either end and one just forward of the jackshaft, are also of 4-inch, channel-sectional steel, hot-riveted to the side-members.

Wheels are made according to S. A. E. specifications, both front and rear being 34 inches in diameter. Tires are of Firestone solid type, 34 by 4 inches, mounted on demountable rims. The over-all height from the ground is 91 inches. The loading space back of the seat is 100 inches in length, 45 inches in width and has a height of 58 inches. These dimensions apply to the clear space within the body.

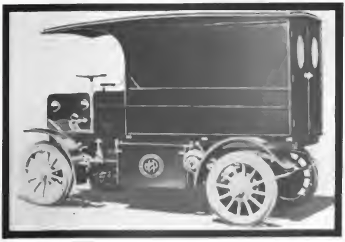


Fig. 4—P. & M. 1-Ton Electric

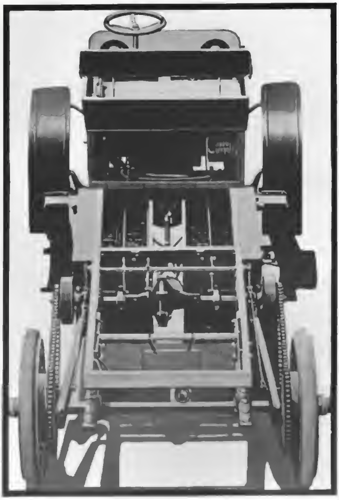


Fig. 5—Chassis of P. & M. 1-Ton Electric

The Agricultural Mot

Big Variety of Tractors in the Indust
Awarded to the Rumely Oil Pull Ty
Products—Shiploads of Tract
Pass Thro

Aultmann-Taylor Turning in the Tests

Case 60-Horsepower Kerosene Tractor

Huge International Kerosene Tractor

Aultmann-Taylor in Its Official Test

WINNIPEG, Man.—The agricultural motor trials held here from July 6 to 18 proved the most successful ever conducted in connection with the Winnipeg Industrial Exhibition and attracted a large entry list and greater public attention than ever before. The variety of tractors ranged from the huge Mogul of 120 horsepower to the 20-horsepower type for small farmers. There were gasoline tractors, kerosene tractors, steam tractors, combination gasoline-kerosene tractors and the unique caterpillar type.

The trials consisted in plowing on virgin soil or breaking, as it is familiarly known, at a distance of 14 miles from this city. The ground was staked out and each machine made a 6-mile test in each competition. The fuel consumption was taken into consideration by the judges, also the uniform depth of the furrow, its uniform width and the general conditions of the work. A dynamometer was placed between the tractor and the bank of plows to secure the drawbar pole. This instrument was not of as accurate a type as should be used in such a contest.

Awards in Agricultural Motor Trials

The judges in their final report of awards awarded the grand champion certificate to the Rumely oil pull type made at La Porte, Ind.; they considering this engine to make the best showing on all points of the contest. The other awards follow:

Class B—Gasoline engines whose cubic piston displacement is 300 cubic feet per minute and under.

First, Case, gold medal; second, Goold Shapley and Muir, silver medal; third, Avery, bronze medal.

Class C—Gasoline engines whose piston displacement is 500 cubic feet per minute and over.

First, Aultmann-Taylor, gold medal; second, International Harvester, silver medal; third, Holt Caterpillar, bronze medal.

Class D—Kerosene engines whose piston displacement is 500 cubic feet per minute and under.

First, International Harvester, gold medal; second, Rumely, silver medal; third, Avery, bronze medal.

Class E—Kerosene engines whose piston displacement is over 500 cubic feet per minute.

First, Rumely, gold medal; second, Aultmann-Taylor, silver medal; third, International Harvester, bronze medal.

Class F—Steam engines 60 horsepower or under. Case, gold medal.

Class G—Steam engines over 60 and under 100 horsepower. Case, gold medal.

Class H—Steam engines 100 horsepower or over.

First, Case, gold medal; second, Sawyer Massey, silver medal.

More or less criticism has arisen in that oil consumption was not considered in the fuel consumption class. The general conduct of the test was quite crude and while those in charge had every desire to show fairness to the last word, there was a lack of understanding in connection with the details. Those in charge were generally professors taken from American agricultural schools who lacked practical knowledge in the conduct of a test of this nature and administered the rules in a more or less rough and ready form.

From the entry list which is reproduced below it can be seen that practically all of the entrances were American

rials Held at Winnipeg

hibition — Grand Champion Certificate
early All Entries were American
Manitoba and Saskatchewan
innipeg

products. One of two Canadian-made products competed but there was not a solitary European tractor in the trials. At present Canadian sympathy is not favorable to the American product, but according to F. E. Muscovics, who has followed these trials closely, the American tractor maker is a big friend of the Canadian farmer. In that he sells his machine on months of credit the present tractor sells for $2,500 and if a machine selling at $1,200 could be brought out it would be impossible to supply the demand.

Western Canada is probably one of the best markets at the present time for these big machines and manufacturers are fully alive to the importance of the annual contest at Winnipeg and in spite of the heavy expense which is entailed in shipping the machines and keeping a staff of experts on the ground to take care of the engines they come in increasing numbers every year.

Engine plowing is becoming general on the larger farms and with the introduction of the one-man type of tractor the demand will still continue to grow.

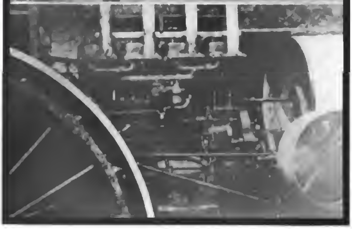
The number of tractors that are used at the present time in the breaking of the prairie sod, plowing, harvesting, thrashing, etc., is so large that the figures have been questioned on several occasions and in order to ascertain the number in use at the beginning of the present year a census was taken in the provinces of Manitoba and Saskatchewan. This showed a total of slightly over 6,000 operating in Saskatchewan and 2,500 in Manitoba. Owing to the difficulty of completing the work in Alberta no figures could be obtained giving the exact number in use, but it is certain that it is higher than the figures given for Manitoba, as the province of Alberta is fast losing its title as a ranching country and is giving way to the forward march of the big gas tractor.

Considerable interest is aroused the world over by the huge trail-load shipments of these tractors that are passing through Winnipeg at frequent intervals. A recent shipment from the factory of the Rumely Products Co., La Porte, Ind., was made up into a train over a mile long and came into Winnipeg over the line of the Midland Railway, where it was split into four separate trains and re-consigned to points farther west. In the taking of the census no effort was made by the departments of agriculture to separate the steam and the gasoline tractors so that it is impossible to give the exact proportions of each in use. It is, however, safe to assert that the gas tractor holds fully 75 per cent. of the record of machines in service.

Plowing Tests for Motor Tractors

Plowing commenced on July 15 at 3 p. m., the first engine to get under way being the 30-60 horsepower Aultmann-Taylor using kerosene fuel. This engine pulled seven 14-inch Deere plows over a course .75 mile straightaway, turning and coming back to the starting point, or covering a distance of 1.5 miles to make the complete circuit. It was originally decided to have each machine make five circuits, but when the tests were in full swing it was found that four laps would be sufficient to provide all the data necessary and the total distance covered by each engine was 6 miles.

The Aultmann-Taylor machine made a fine showing, covering the 6 miles with a fuel consumption of 16 gallons of kerosene and 1 gallon of gasoline. On the first round made by



The Caterpillar Agricultural Tractor

The Minneapolis Tractor After a Test

Case 30-Horsepower Tractor Ready for Work

Motor in Big Four Tractors

Avery 20-Horsepower Tractor, Bronze Medal

Crowds Following the Official Tests

this engine the course had only been staked out half way causing some little delay and marring the time sheet somewhat, as no allowance was made by the judges for time lost from this cause. Between the engines and the plows a dynamometer was placed to ascertain the draw bar pull. Plowing was at an average depth of 4 inches and each engine was under the charge of two assistant judges, who kept careful record of the work accomplished.

The second engine to get under way was one of the Case steamers. This was of a nominal 40-horsepower and was pulling six Case-Sattley plows. The plowing done by this outfit was clean, the sod being well turned over and evenly laid.

Next in order of appearance was the big Mogul entered by the International Harvester Co. This was also of the kerosene fuel burning type and was hauling five Parlin Orendorff bottoms.

Fourth on the list was a Rumely oil pull engine, kerosene fuel, 15-30 horsepower, with five Rumely plows attached. This engine did equally as good work as its predecessors and was followed by a big crowd during the run.

The last engine to take the plow test on Monday was the Case gasoline tractor. This is the first of the Case gasoline tractors that has been entered in competition in western Canada and marks the entry of the Case company into the gasoline tractor field.

The best time for the day's work was made by the Aultmann Taylor engine, which covered the 6 miles in a total elapsed time of 2 hours 34 minutes.

More Engines at Work on Second Day

The second day of the contest showed no falling off in the interest taken by the general public in the work of the big tractors and the fact that there were more engines at work gave the onlooker a better chance to make comparisons between the different makes.

The Holt caterpillar was the first engine out and it started work with eight Cockshutt plows which it pulled for the first round and then dropped one and finished its work with seven. The engine showed 40 horsepower on the draw bar and a fuel consumption of 15.91 pounds of gasoline to the acre, the weight being taken by the judges at 7 pounds to the gallon, imperial measure.

The next out was the 30-60 Aultmann-Taylor engine, which made a splendid showing both in the style of the plowing and in the fuel consumption, finishing the test with a record of 12.77 pounds to the acre burning gasoline. Nine Deere plows were pulled by this engine throughout the tests.

The Rumely Oil Engine at Work

The Rumely oil pull 30-60 went to work with nine Rumely plows, but dropped one at the end of the first round. The fuel used was kerosene and the consumption was given as 18.47 pounds per acre.

The International Harvester Titan engine, 30-horsepower, twin-cylinder, went through the test with five Oliver plows and burned gasoline, the consumption being 17.7 pounds per acre.

The Goold Shapley and Muir entry 30-45-horsepower, double-opposed, started out with six Cockshutt plows, but dropped out of the contest owing to a failure of the cooling system which was of a new design and was found of insufficient capacity to perform the cooling satisfactorily. A second engine of the same make went through with four plows, burned gasoline and pulled six Cochshutt plows.

The new Case gasoline tractor performed well with five Case-Sattley plows on a fuel consumption of 17.9 pounds per acre.

An Avery gasoline tractor also made its initial appearance pulling five plows of the new type Self Lift, which allows of the entire work both in connection with the engine and the plows being done by the one man.

Case 60-Horsepower Steamer, Gold Medal

Rumely Oil-Pull the Grand Champion

Goold, Shapley & Muir Tractor

International Mogul, Gold Medal, Class D

The International Harvester Mogul 45-horsepower pulled eight Oliver plows and showed a fuel consumption of 20.79 pounds per acre.

The new Sawyer Massey gasoline engine 22-45 horsepower pulled five Deere plows and made a good showing in the plow work.

The Canadian Heer 20-25-horsepower, four-wheel drive and steer was followed by a large crowd when plowing with four Cockshutt bottoms and finished with a fuel consumption of 20.79 per acre.

The Case steamer was the center of interest to a number of farmers and worked throughout with the greatest ease. This engine is 110-horsepower and pulled twelve Case-Sattley bottoms 14 inch.

The American Gas Tractor 20-45-horsepower had ten Deere plows in tow and used gasoline for fuel.

The International Harvester Mogul

The 45-horsepower International Harvester Titan pulled nine P and O plows on the first round and ten on the remainder. The fuel consumption was given as 12.90 pounds per acre, running close to the Aultmann Taylor record.

The Case 30-60 kerosene tractor took eight Case-Sattley plows, and the Sawyer Massey steamer showing 32-horsepower at the drawbar had ten Deere plows during the run.

The Avery 20-35 kerosene burning engine did good work with four Avery Self Lift plows.

The 45-horsepower International Harvester Mogul which was entered in both the gasoline and kerosene classes had eight plows in tow when working through the kerosene test, but figures as to consumption were not available at the end of the run. They will, however, be found in the table of results issued by the judges at a later date.

The points on which the judges make the award are: Draft, evenness of furrow depth, lay of furrow slices, evenness of cut of inside plow, ease of adjustment and manipulation of plows in and out at ends, straightness of furrows and stops attributable to plow.

The full list of entries was: Class B, gasoline engines—

2. Canadian Heer, Heer Mfg. Co., Portsmouth, O.
3. Avery Mfg. Co., Peoria, Ill.
4. Case Threshing Machine Co., Racine, Wis.
5. Goold Shapley and Muir, Brantford and Calgary, Can.
6. International Harvester Co. of America, Chicago.
7. Sawyer Massey Co., Hamilton, Ont.
8. International Harvester Co. of America, Chicago.
9. International Harvester Co. of America, Chicago.
10. Goold, Shapley and Muir, Brantford, Ont.
11. Canadian Holt Caterpillar tractor.
12. Aultmann Taylor Co., Mansfield, O.
13. Case, J. I., & Co., Racine, Wis.
15. American Gas Traction Co., Minneapolis, Minn.

Class D, kerosene—

16. Rumely Oil-Pull, Rumely Products Co., La Porte, Ind.
18. International Harvester Co. of America, Chicago.
19. Avery Mfg. Co., Peoria, Ill.
22. Canadian Heer, Heer Mfg. Co., Portsmouth, O.

Class E, kerosene—

20. International Harvester Co. of America, Chicago.
21. International Harvester Co. of America, Chicago.
22. Aultmann Taylor Co., Mansfield, O.
23. Rumely Oil-Pull, Rumely Products Co., La Porte, Ind.
24. Case, J. I. Case Co., Racine, Wis.

Class F, G, H—

25. Case, J. I. Case Co., Racine, Wis.
26. Case, J. I. Case Co., Racine, Wis.
27. Case, J. I. Case Co., Racine, Wis.
28. Case, J. I. Case Co., Racine, Wis.
29. Sawyer Massey Co., Hamilton, Ont.

Hackney Motor Plow, a Non-Contestant

International Titan 30-Horsepower Tractor

TRADE and PERSONAL ITEMS

Ten Baker Electrics in Cleveland's Sane Fourth of July Celebration. The Company Has Recently Shipped Twelve to the American Express Co., Washington, D. C.

Ernest Van Toff has been appointed chief engineer of the Pitt Motor Truck Co., Pittsburgh, Pa.

J. T. Langhorn of the Packard Motor Car Co., Detroit, Mich., has resigned as manager of the truck department.

J. O. Stewart has succeeded W. J. Voit as manager of the Spokane, Wash., branch of the Diamond Rubber Co.

Hess-Bright Mfg. Co., Philadelphia, Pa., has transferred its office to its new factory on Front street and Erie avenue.

The Locomobile Co. has commenced work on the new building to be used for the construction of commercial vehicles.

The Los Angeles Branch of the Locomobile Co. is now occupying its new permanent headquarters at Pico and Grand avenues.

The Washington Post, Washington, D. C., is planning for a parade on Labor Day of commercial vehicles, and is offering $340 in prizes.

Arthur H. Berndt has been appointed assistant manager of the Indianapolis branch of the Remy Electric Co., to take effect September 1.

D. K. McBride, office manager of the Universal Motor Truck Co., Detroit, Mich., has been appointed to the position of factory manager.

Fred. A. Crooks has been appointed sales manager of the New York branch of the Alco. He has been identified with the industry for 5 years.

Packard Motor Car Co. is constructing on the south side of Wood street, east of Broad street, Philadelphia, Pa., a one-story garage, costing $12,000.

George A. Crane has been appointed to take charge of the truck business in the territory controlled by the Chicago branch of the Locomobile Co.

E. B. Van Wagner Mfg. Co., Syracuse, N. Y., has opened a salesmen's office at No. 305 Ford Building, Detroit, Mich., with Harry C. McCallum, Jr., as manager.

Horace De Lisser, vice-president of the United States Motor Co., has resigned, to take up the chairmanship of the board of directors of the Ajax-Grieb Rubber Co.

O. W. Klose, manager for the United Motor Co., Minneapolis, Minn., will have a service department organized in the near future for the benefit of Sampson truck owners.

H. W. Evans Locomobile Co., Bridgeport, Conn., and connected with the San Francisco branch for the last 2 years, has been put in charge of the truck business on the Pacific Coast.

H. L. Winter has been appointed gen-

Commercial Vehicle Incorporations

Universal Motor Truck Co., Portland, Me. Capital $10,000. Incorporators: Clarence E. Eaton, T. L. Croteau and James E. Manter.

Egypt Garage & Machine Co., Scituate, Mass. Capital $6,500. Incorporators: Williams E. Chaffin, Charles W. Peare and Charles M. Litchfield.

Westfield Motor Truck Co., Westfield, Mass. Capital $100,000. Incorporators: Walter F. Mogill, Ernest L. Hull and Henry W. Hallbourg.

Universal Auto Supply Co., New York City. Capital $10,000. Incorporators: John J. Treney, George F. Connelly and John R. Hunt.

American Motor Freight Co., New York City. Trucking business. Capital $25,000. Incorporators: Harry G. Waring, Harvey W. Bell and Howard Phillipps.

Russian Tyre Sales Co., New York City. To deal in rubber, tires, etc. Capital $30,000. Incorporators: Otto Braumwarth, H. Ray Paige and M. S. Paige.

Canadian Overman Co., Inc., New York City. Tires, etc. Capital $50,000. Incorporators: W. Albert Pease, Jr., Albert Z. Gray and Lucius Wilmerding.

Gramm-Barnstein Co., Lima, O. To make motor trucks. Capital $500,000. Incorporators: Max Bernstein, B. A. Gramm, Harry O. Bentley and Fred Biszantz.

Ideal Motor Car Co., Columbus, O. To manufacture and sell light delivery wagons. Capital $20,000. Incorporators: C. J. Amendt, J. C. Reichart, D. N. Postlewaite, T. J. Shaffer and E. Bragunier.

Essenkay Sales Co., Portland, Me. Tires, etc. Capital, $50,000. Incorporators: D. J. Snow and H. P. Sweetser.

Marion Motor Car Co. of Boston, Boston, Mass. Capital, $5,000. Incorporators: Mendel Borofsky, Samuel H. Borofsky and Morris Gold.

Auto Distributers Limited Co., Camden, N. J. Capital, $200,000. Incorporators: Frank R. Hansell, J. C. Clow and John A. MacPeak.

Circle Taxicab Co., Inc., New York City. Capital, $2,800. Incorporators: John Hefferon, Margaret T. Hefferon, John F. Kavanagh and Catherine J. Kavanagh.

Essenkay Sales Co. of New York, New York City. To deal in all kinds of motors. Capital, $100,000. Incorporators: Henry S. Young, Byron F. Abbott and William C. Oliver.

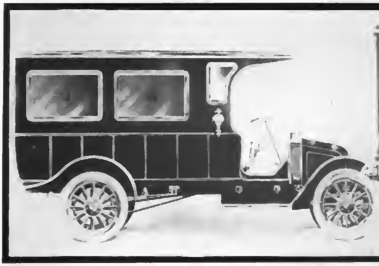
New York Motors, Inc., Syracuse, N. Y. To manufacture motors, etc. Capital $10,000. Incorporators: Ernest W. Lawton, Theodore Young and Charles S. Lawton.

Shafer Decker Co., Rochester, N. Y. To manufacture and deal in motor vehicles. Capital $50,000. Incorporators: C. P. Hugo Schoellkop, Charles B. Shafer and Frederick J. Decker.

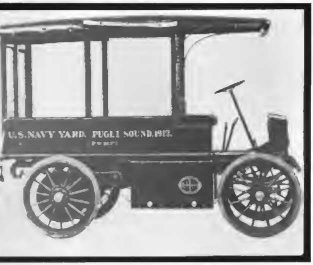
Coates Commercial Car Co., Goshen, N. Y. Capital $250,000. Incorporators: Robert Gibson, Jr., L. Barton Case and Powell Crichton.

Munsing Tractor Co., New York City. To manufacture and deal in motor vehicles. Capital $600,000. Incorporators: Basil Magor, Robert H. Allen and Herman C. Kluse.

Acme Motor Delivery Co., Cincinnati, O. To operate an express business in this city and suburbs. Capital $15,000. Incorporators: W. E. Minor, F. L. Allen, S. B. Sutphin, Davis Wachmann and J. B. Minor.



Lippard-Stewart Undertaker's Car for James Cowrey & Sons, Pittsburgh, Pa.



Kentucky Wagon Mfg. Co.'s 1000-Pound Vehicle in U. S. Navy Yard Service

eral sales manager of the Universal Motor Truck Co., Detroit, Mich. He was formerly sales manager of the Federal Motor Truck Co.

L. V. Spencer, of the Class Journal Co., has been appointed editorial representative of the COMMERCIAL VEHICLE at the Detroit office, 1501 Ford Building, Detroit, Mich.

Timken-Detroit Axle Co., Detroit, Mich., has issued two booklets entitled "Timken Primer on the Anatomy of Automobile Axles" and "Timken Primer on the Care and Character of Bearings."

Orin S. Wilson, general manager of the Studebaker Colorado Vehicle Co., in Denver, Col., has been called East to supervise more extensive territory. Assistant Manager J. C. Beck has succeeded him.

W. P. Abbey, special representative of the Gramm Motor Truck Co., Lima, Ohio, has resigned, to succeed C. M. Rodgers as sales manager of the Bowling Green Motor Car Co., Bowling Green, Ohio.

The Packers Motor Truck Co., Wheeling, W. Va., has opened a branch office at 1734 Broadway, New York City. Besides this office this company has a service station of 7,500 square feet on West Forty-second street.

C. W. Nash has been appointed vice-president of the General Motors Co., after serving for the past 2 years as vice-president and general manager of the Buick Motor Co., one of the subsidiaries of the General Motors.

Torbenson Gear & Axle Co. has moved its plant from Bloomfield, N. J., into a new factory at 216-224 High street, Newark, N. J. The factory is completely equipped with the latest improved types of machines for the production of axles.

A motor truck service for the shipment of freight and express consignments is soon to be conducted between Elmira and Troy, N. Y. The trucks will make daily trips between these points, receiving consignments along the route.

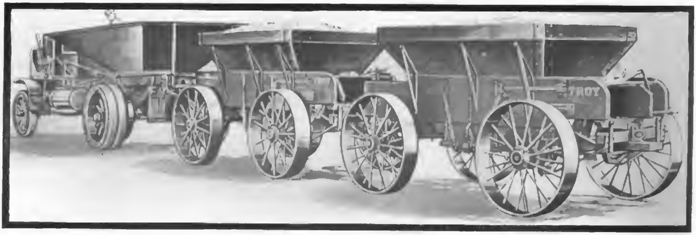
F. T. Burke recently joined the Kelly Motor Truck Co.'s Western department with headquarters at San Francisco. He has been connected with the Kelly interests in New York, Philadelphia, and Springfield, O., during the past five years.

The Otto Gas Engine Works, Philadelphia, has not any corporate connection with the Otto Mobile Co., of Mt. Holly, N. J., which is now in the hands of a receiver, this company acting only as sales agents for the past year. The Otto Gas Engine Works will handle its output direct with dealers throughout the United States and abroad.

The Canadian Auto Bus Co., Montreal, Que., in a report to the city council states that it intends to use 2286 motor buses in Montreal service, with 64 additional ones for reserve use. This means an investment of $5,000,000. It will take four months to establish the first circuit and thereafter 25 buses per month will be installed until the entire service is complete.

Indianapolis is to have a new carburetor factory, a new $25,000 corporation having been organized for this purpose. The carburetor is the invention of Martin C. Bright, and among those associated with the new organization are S.

Line-up of Five 2-Ton Baker Electrics Used in Different Depots of Heinze & Co., with White Bodies and Apple-Green Running Gears



Knox 6-Ton Truck with Two Trailers of 3-Cubic Yards Capacity Each. Two Outfits Have Been in Use in Sioux City, Ia., for 1 Year. They Do the Work of Ten Two-Horse Teams

M. Brundage, Ulric Z. Wiley, Clifford Arrick, H. S. Rominger and Dr. C. E. Day. The company will begin the manufacture of carburetors January 1.

The Westfield Motor Truck Co., Westfield, Mass., recently incorporated under the Massachusetts law for $100,000, is manufacturing a 1500-pound delivery wagon and a 1-ton truck. All of the capital has been paid in. Among the officials of the company are: W. F. Magill, president; P. N. Hall, treasurer, and J. A. Graham, formerly of the Brightwood Motor Co., chief engineer.

Captain Williams, of the United States Army, who had charge of the recent truck demonstration from Dubuque, Ia., to Madison, Wis., where the army went into camp, has issued the following report on the Velie 3-ton truck, which was in the army service for this run. "The truck was used in hauling army supplies for 2200 soldiers. During the march it was necessary in places to use straw on the sand roads in order to get traction. The average gasoline consumption was 5 miles per gallon."

The Ross Gear & Tool Co., LaFayette, Ind., has placed contracts for a new building with 50,000 square feet of floor space to be used in the manufacture of steering gears and differentials for commercial vehicles. The new building will be a two-story structure, fireproof throughout, with concrete floors, walls and roof supports and steel columns and tile roof. The company is at present employing 150 men, which will be increased to 200 when the additions are finished, which will be in September.

The Simms Magneto Co., Bloomfield, N. J., management of which was recently obtained by the Edwards Motor Car Co., New York, has been recently reorganized and the capital increased from $1,000,000 to $1,750,000. The new capital has been sufficient to wipe out all the indebtedness of the company and furnish a working capital of $300,000 cash. The company has also $100,000 worth of magneto materials on hand, much of it in a complete manufactured state. The manufacture of magnetos has already been started and the working force will be increased as the organization proceeds. At present instruments for four-cylinder and six-cylinder machines are being turned out. The company has also secured the American rights for the S. U. carburetor, an Eng-

Truck Market Possibilities for American Commercial Vehicle Makers

Director Loeb, of Philadelphia, Pa., recently opened proposals and ordered them scheduled for motor fire equipment, for which $35,000 was appropriated by the council.

Youngstown, O., was recently opened for bids for motor fire apparatus.

Portland, Ore., is to have eight new motor-driven hose and chemical wagons, a motor engine and an aerial truck.

Contracts for furnishing the city with three combination motor-driven chemical hose wagons were awarded the American-LaFrance Fire Engine Co., by Scranton, Pa.

The purchase of motor-driven fire apparatus is being considered by New Castle, Pa.

Jackson, Tenn., has purchased a motor fire engine.

Richmond, Va., has purchased a motor-driven ambulance.

Madison, Wis., has purchased a combination chemical and hose wagon.

Victoria, B. C., has received its motor hose wagon and chemical engine, together with the two 80-horsepower chassis for the city service truck and fire engine.

Oroville, Cal., is considering the installation of a motor-driven chemical and hose wagon.

The city council of Oskaloosa, Ia., has purchased another combination chemical and hose wagon.

Motor-driven fire apparatus will be purchased for Hilltop, O.

A motor-driven engine and hose wagon will be purchased for Ogden, Utah.

The installation of motor-driven fire apparatus is being considered by Eau Claire, Wis.

The city council of Waterloo, Ia., will purchase another motor-driven chemical and hose truck.

Minneapolis, Minn., has purchased a gasoline pumping engine.

Penn Yan, N. Y., has purchased a combination motor truck and chemical engine.

Selma, Ala., is considering the purchase of a motor-driven fire fighting machine.

The purchase of a chemical truck is being considered by the council at Sawtelle, Cal.

Trustee Cottle, head of the city council committee of Tulare, Cal., is investigating motor-driven fire apparatus which will cost $10,000.

The purchase of motor fire apparatus is being considered by the board of fire committee headed by Chief Carter and Secretary Ralph Gaylord, of Union Grass Valley, Cal.

Plans and specifications were adopted for a motor patrol for the police department at Stockton, Cal.

Macon, Ga., is now in possession of nine fire fighting machines.

Waterloo, Ia., will purchase another combination chemical and hose motor truck.

Elkhart, Ind., has purchased a motor police patrol wagon.

Grand Rapids, Mich., is open for bids on two hose wagons and a motor-driven tractor.

St. Louis, Mo., during May ordered and had delivered $1,000,000 worth of motor fire apparatus.

Two more police patrols have been purchased by Kansas City, Mo.

Plainfield, N. J., received a proposition from the International Motor Co., to make use of a motor power combination fire engine and hose wagon on a rental basis. This is being considered by the fire and building committee.

Orange, N. J., will purchase motor-driven fire apparatus.

Sealed proposals have been received by the clerk of the Village of Richmond, O., for combination pumping fire engine and hose wagon.

Fire Chief Kenney and members of the city council of Berkeley, Cal., recently watched the tryout of a Knox hose wagon and if changes suggested by Chief Kenney be made same will be purchased.

Riverbank, Cal., is arranging to purchase motor-driven fire apparatus.

The city council of Grand Island, Neb., is considering the purchase of motor fire apparatus.

Glendale, Cal., is considering the installation of motor-driven fire apparatus.

Motor-driven fire apparatus for Quitman, Ga., will shortly be purchased.

Dubuque, Ia., is considering the purchase of motor fire apparatus.

Peoria, Ill., will purchase a car for chief's use in answering calls.

Pittsfield, Mass., voted to purchase an aerial motor truck to cost $11,000.

Southbridge, Mass., is considering the purchase of motor-driven fire apparatus.

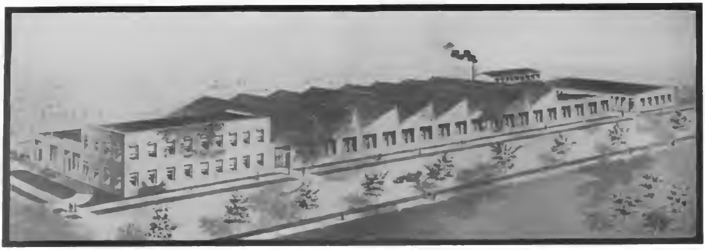
Motor-driven fire apparatus is being considered by Elwood City, Pa.

Bids were recently received at Richwood, O., for motor-driven fire apparatus.

Sterling, Colo., has made arrangements for the purchase of a motor fire truck.

The council of Dowagiac, Mich., has authorized the purchase of a motor-driven fire truck.

The Council of Cincinnati, O., authorized the insurance of bonds for bids on 11 new auto patrols.



New Factory of Ross Gear and Tool Co., La Fayette, Ind., for Making Truck Parts

sh invention, and expects to begin the manufacture of this in the early fall and ave it in the market by the first of the ear.

Packard Motor Car Co., Detroit, Mich., as made the following changes in the st of Packard dealers: The names of The Eastern Motor Sales Co., Albany, has een changed to read Dominant Motor Co.; L. C. Edelblut, Augusta, Ga., to H. B. Odell; Alvan T. Fuller, Boston, to Packard Motor Car Co. of Boston; The Osmond L. Barringer Co., Charlotte, N. C., to Osmond L. Barringer; The MacFarland Auto Co., Denver, to The MacFarland-East Auto Co.; W. D. Rightmire, Duluth, to Zenith Tire Service Co.; Peck-Haynes & Co., Grand Rapids, to Peck Auto Co.; The Meridian Auto Co., Indianapolis, to Carl G. Fisher & Co., 215 W. Michigan street; E. P. Moriarty & Co., Kansas City, to Packard-Kansas City Co., Thirty-fourth street and Broadway; The Electric Garage Co., Omaha, to The Orr Motor Sales Co., Fortieth and Farnam streets; The United Construction & Supply Co., Regina, to The United Motor Co., Ltd., Albert and Fourteenth streets; J. T. Keena & Co., 600 East Pike street, to Twelfth avenue at East Pine; Edward B. Zane, Spokane, to The Edward B. Zane Co., Inc.

New Commercial Vehicle Agencies Established Throughout the Country Recently

Place	Car	Agent
Alpine, Mich.	Dart	I. F. Siaesman
Los Angeles, Cal.	Dart	Commercial Motor Truck Co.
Knoxville, Tenn.	Dart	J. F. Walker & Co.
Cleveland, O.	Dart	M. H. Fletcher
Boston, Mass.	Dart	E. A. Hall Motor Truck Co.
Waterloo, N. Y.	Dart	Wm. Shoonmaker
Ogdensburg, N. Y.	Motor Wagon	C. A. Sparrowhawk
Bluffton, Ind.	Motor Wagon	L. G. Starr
Delta, Col.	Motor Wagon	Turner & Huntley
Huntington, Ind.	Motor Wagon	Morehead Bros.
Allentown, Pa.	Motor Wagon	Queen City Motor Co.
Mt. Sterling, O.	Regal	H. Clay McKee & Sons
Cincinnati, O.	Peerless	Peerless Motor Sales Co.
Montreal, Can.	G. V.	R. E. T. Pringle
Washington, D. C.	Atterbury & Harfield	Motor Truck Co.
Winnipeg, Man.	G. M. C.	Walter Jackson
Mt. Vernon, Ill.	Franklin.	H. A. Sanders
Norwich, Conn.	Franklin.	F. O. Cunningham
Morris, Ill.	Franklin.	D. S. Huff
Iowa City, Ia.	Franklin.	F. C. Carson
Akron, O.	Velie	H-F-M Mfg. Co.
Mansfield, O.	Velie	C. H. Voegele
Cleveland, O.	Velie	Auto Sales Co.
Hamilton, O.	Velie	Central Motor Co.
Marion, O.	Velie	Chas. Hoyles
Bridgeport, Conn.	Lauth-Juergens	Eddy-Sherwood Carriage & Motor Co.
Holyoke, Mass.	Adams	Magna Auto Co.
Winsted, Conn.	Adams	Roscoe Benjamin
Boston, Mass.	Adams	Ben Weston Atwood
Columbia, S. C.	Federal	Gibbs Machinery Co.
Atlanta, Ga.	Federal	Cole Motor Co., of Georgia
Mobile, Ala.	Federal	Mobile Auto Co.
New Orleans, La.	Federal	Fairchild Auto Co.
Memphis, Tenn.	Federal	John F. Cubbins
Cleveland, O.	Federal	Eckenroth Sales Co.
Syracuse, N. Y.	Universal	James Auto Co.
Los Angeles, Cal.	Universal	Hawley-King Co.
Louisville, Ky.	Morgan.	Commercial Motors Co.
Delhi, N. Y.	Morgan.	Chas. T. Telford
Herkimer, N. Y.	Morgan.	Jas. H. Lafayatte
hicago, Ill.	Morgan.	A. J. Shuett
incinnati, O.	Blair	Chas. Schlaar Motor Car Co.
yracuse, N. Y.	Sanford	C. Arthur Benjamin, Inc.
hicago, Ill.	Sanford	Pope Hartford Co.
oston, Mass.	Sanford	Brooks & Palmer
ansas City, Mo.	Lincoln	Indiana Garage & Sales Co.
inghamton, N. Y.	Alco.	H. T. Rogers
emphis, Tenn.	Alco.	Six Thirty-Eight Tire & Vulcanizing Co.
eekskill, N. Y.	Alco.	W. H. Ash
ochelle, Ill.	Alco.	Geo. E. Stocking
algary, Alb., Can.	Alco.	Geddes & Sheffield
dmunton, Alb., C.	Alco	Taylor & Musson
altimore, Md.	Locomobile	A. M. Pearson
ouleville, Ky.	Mack & Saurer.	Leyman Motor Co.
ontreal, Ont.	Morgan	Henderson & Richardson
Regina, Sask.	Gramm.	United Motor Co.
Allentown, Pa.	R-C-H	Queen City Motor Co.
Battle Creek, Mich.	R-C-H	F. E. Riley
Coldwater, Mich.	R-C-H	Coffman & Boucher
Scranton, Pa.	R-C-H	Edward & Harold Conrad
Woodstown, N. J.	R-C-H	Newton & Reeves
Boston, Mass.	Veerac	W. L. Russell & Co.
Harrisburg, Pa.	B. O. E.	J. M. Mack
Kansas City, Mo.	Regal	E. P. Moriarty & Co.
Middletown, O.	Chase	F. VanSickle & W. F. Nichols
Milwaukee, Wis.	G. M. C.	Skuol & Schauer
Montreal, Que.	Foden	Jones & Glascco
Philadelphia, Pa.	Chase	Chase Motor Sales Co.
San Francisco, Cal.	Lippard-Stewert	A. E. Hunter Motor Car Co.
Burlington, Ia.	Kissalker	Hawkeye Motor Car Co.
Lock Haven, Pa.	Kisselkar	John K. McCormick
Port Richmond, S. I.	Kisselkar	Granite Motor Car Co.
Browntown, Minn.	Kisselkar	Zander & Krueger
Elmira, N. Y.	Atterbury	La France Motor Co.
Philadelphia, Pa.	Atterbury	Atterbury Motor Truck Co.
Washington, D. C.	Atterbury	A. H. Shoup
Paducah, Ky.	Atterbury	C. E. Baker
Benton H., Mich.	Atterbury	Coval Motor Car Co.
Moravia, N. Y.	Atterbury	C. E. Weaver
Baltimore, Md.	Atterbury	Atterbury Motor Truck Co.
Richmond, Va.	Atterbury	Arnold W. Belmont
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Houston, Tex.	G. M. C.	Texas Wagon Works
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Dickinson, N. D.	Veerac	Grant A. Palmer
Jamestown, N. D.	Veerac	Anderson Motor & Machine Co.
Aberdeen, N. D.	Veerac	McArthur Machine Co.
Fairbault, Minn.	Veerac	Mutual Auto Co.
Wichita, Kan.	Lincoln	Baldwin Smith Motor Truck Co.
Mendota, Ill.	Franklin	Thair & Gehant
Hartford, Conn.	Velie	H. W. Yeager
Providence, R. I.	Piggins	Harris Bros. Auto Co.
Topeka, Kan.	Lincoln	J-A-R Motor Co.
Columbus, O.	Alco	M. P. Murman
Portland, Me.	Universal	Universal Motor Truck Co.
Providence, R. I.	Veerac	Motor Service Co.
Sydney, Australia	Speedwell	W. H. Cooper Co.
Pittsburg, Pa.	Speedwell	Pioneer Motor Car Co.
Lewisburg, Pa.	Speedwell	W. D. Schemer

MISCELLANEOUS

Place	Car	Agent
Philadelphia, Pa.	Motz Tire	Wm. M. Stubbs
Cleveland, Ohio	Motz Tire	Chas. Serfass

Horsepower and Gear Ratio in Trucks

E. P. Batzell Presents Paper Before Society of Automobile Engineers at Detroit Urging Smaller Motors, and Makes Recommendations for Drive Ratio Between Motor and Rear Wheels—Part I

THE question of the selection of motor sizes for commercial vehicles has not been discussed much or often. It may be discussed as to several different basic conditions. In this paper it will be taken up principally from the standpoint of general economy, this being presumably most vital in successful commercial car service. Under general economy there are not only economy in consumption of fuel and oil, but also economy in the initial cost of the motor and its whole upkeep expense. At first the consumption of fuel only will be investigated, as to its variation according to different motor sizes for the same work. By assuming equal working conditions whenever comparison is being drawn, one need not keep track of the total fuel consumption in every case, but of merely the consumption per developed unit of work.

The abnormally great variation of present truck motor sizes is obvious. Taking the motor sizes of trucks of equal hauling capacity, as shown this year at the principal motor shows, one will find in the case of 1-ton trucks the piston displacement varying from 144 cubic inches to 350 cubic inches, and in the case of 3-ton trucks from 230 cubic inches to 570 cubic inches. Figuring the above volumes at an equal piston speed of about 800 feet per minute, the respective variations become: total piston displacement per minute of 1-ton truck motors from 100 cubic feet to 178 cubic feet, and of 3-ton truck motors, from 135 cubic feet to 264 cubic feet. Taking into consideration the difference of the weight of the vehicles proper together with their rated load, the piston displacement per pound of this weight in the case of the 1-ton truck varies from 40 cubic inches up to 61 cubic inches and in the case of the 3-ton truck from 21 cubic inches to 38 cubic inches per minute.

When a certain truck does a definite amount of work by using some 50 per cent. less volume of piston-swept cylinder space than a similar truck of another make, one motor may be developing less power per cubic inch of piston displacemnt than the other, or the power losses in the mechanism of one truck may be much greater than in the other. The efficiency of a motor truck driving mechanism differs greatly according to the general constructive features incorporated. However, in many cases of well-built trucks the transmission of the motor power to the driving-wheels occurs under approximately equal conditions. Consequently the motors of different size, but developing the same power, are acting under entirely different conditions in regard to transforming their gas explosions into outside work.

The power developed per unit of piston displacement depends on the charge taken into the cylinder, the compression ratio, the heat losses, the carburation and gas mixture consistency, ignition, timing and a few other things. The present discussion refers only to common four-cycle engines. The compression space in truck motors is frequently 28 to 30 per cent. of the total cylinder volume, as against 20 to 23 per cent. and sometimes less in pleasure cars. Inasmuch as high-compression motors develop at medium speed relatively more power than low-compression motors, the difference in truck motor sizes can be explained in part by the difference of compression used. A variation of motor size within 5 to 10 per cent. of the piston displacement can be thus explained.

In certain cases it happens that a manufacturer uses a pleasure car type motor for trucks, either because the same motor is used also in his pleasure cars or because he is able to secure the motors on otherwise profitable terms. Putting pleasure car motors into trucks explains further why truck motor sizes vary so much. A comparatively small pleasure car engine is apt to have enough power for commercial car purposes in certain cases where otherwise a larger motor would be advisable; the high compression of the former assisting somewhat in power development. Such an engine, if kept working at comparatively slow piston speed, may hold out well and also prove sufficiently economical in fuel consumption, because it has a higher thermal efficiency than the low-compression motor, providing it has a good volumetric efficiency. On the other hand, when an oversized pleasure car engine is used for a truck of comparatively small carrying capacity, the engine will have an abundance of power for even any extreme case of requirement during service, but most of the time it will be developing only a small part of its power capacity. Consequently this engine will work with very little cylinder filling by fresh charge, with small throttle opening, and the thermal efficiency will be low, as well as the mechanical efficiency, because the amount of power lost in the mechanism of the engine proper will be large as compared with the amount of power generated by the motor. Moreover, the initial cost of oversize motors is considerable, and they weigh more and take more space than motors of rational size and power for a given purpose.

It might be said that a larger engine gives better assurance against interruptions in service which are apt to occur from lack of power. This may be true in cases where severe requirements and hard work with large power consumption are anticipated. However, instances of abnormal use of power are not encountered very often, and it should not be considered good policy to fit all trucks of a certain carrying capacity with a power plant large enough to take it at high speed over bad roads on a steep grade. The proper way is to furnish trucks of a certain carrying capacity with power plants of different size to suit most economically the conditions to be encountered in the prospective service. If the selection of power plants is correctly made marked results in economy of service operation can be shown.

IT has been already stated that relatively high compression raises the thermal efficiency. On the other hand, it means higher pressures throughout the moving parts of the engine, and consequently the losses due to friction in them become greater also. Moreover, at slow speed the heat losses through the cylinder wall, especially through that surrounding the combustion chamber, are greater with high engine compression than with low, notwithstanding the larger area exposed to cooling in the latter. In some instances these losses may more than offset the gain in the thermal elapsing of the engine cycle. At any rate, they limit the compression ratio, which is economical for commercial car purposes.

When considering the high compression employed in pleasure car motors it must be remembered that they are high-speed motors working most of the time with comparatively low volumetric efficiency. It seldom happens in pleasure car practice that the motor is run at slow speed with the throttle wide open, and when it does happen the duration of such running is generally short. The high-compression motor has sufficient time to recover from this severe working condition which imposes great requirements upon all its parts, and especially upon the cooling system. Pleasure cars, being driven at slow speed mostly with small throttle opening, or with larger throttle opening at higher speed, take only a small quantity of fresh charge into their cylinders per suction stroke, and consequently, notwithstanding the theoretical compression ratio, the compression pressures are comparatively low. This is because the absolute pressure at the end of the intake stroke is lower in a cylinder working with smaller volumetric filling, and the corresponding compression curve of an indicator diagram starts accordingly so much below the atmospheric line, Fig. 1. The pressure at the end of the intake being Pi and that at the end of the compression Pc, their connecting equation

$$Pc = Pi \times (r)^n$$

reveals that Pc is lower when Pi is so. Here r is the theoretical compression ratio and n the curve factor, both to be considered as independent of the pressures. The commercial cars generally make use of slow-speed engines, which have a more complete cylinder filling by fresh gases, other things being equal. Therefore the high compression ratios, if used in them, would disclose much sooner the bad effects upon the engine parts from the higher pressures of the working cycle, resulting from the more complete volumetric cylinder filling, than if the pressures had been preserved at the average pleasure car values. Thus is established the advisability of a fairly small compression ratio in commercial car motors. Even if this slightly reduces the thermal efficiency, the prolonged life of the motor ought to offset it. Contrary to the nature of pleasure car work the commercial cars are run much more frequently under conditions requiring a fairly constant and large amount of their motor power for a long time. One cannot rely on relieving the motors from signs of overwork during easy runs which alternate with the periods of harder work.

Characteristic curves, obtained from actual tests of motors, give a more or less clear insight into their functioning and also into their fuel consumption together with the laws governing the latter. Figs. 2 and 3 represent examples of developed power, torque and fuel consumption curves, obtained at full load corresponding to every revolution per minute of these motors; in other words, with the throttle wide open throughout the tests. Fig. 2 shows curves of an older type of Thomas 4¾-inch by 5-inch four-cylinder motor, and Fig. 3 curves of an air-cooled Franklin four-cylinder 4 inches by 4 inches, the former being taken from the results of tests at the laboratory of the Mechanical Branch of the Association of Licensed Automobile Manufacturers, and the latter from the results of tests made at Cornell University by Messrs. L. R. Evans and R. P. Lay under the direction of Professor Rolla C. Carpenter. A straight-line power curve, corresponding to the S. A. E. horsepower formula at 1,000 feet per minute piston speed has been added into the diagrams for comparison.

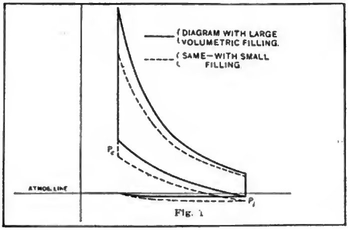

Fig. 1

THE curves representing the fuel consumption per horsepower have a lowest point at a certain motor speed and therefore these revolutions per minute of the motor are the most advantageous for it to work at with full-throttle opening, the rate of fuel consumption being greater at any other revolution per minute. In regard to the location of the point of minimum fuel consumption one may say that it will generally be located close to the revolutions per minute at which the developed motor torque is the greatest. In fact, it should be anticipated at slightly higher revolution per minute. The correctness of this statement will become apparent upon considering that the fuel consumption per power unit generally depends on the rate of power development per piston displacement and on the thermal efficiency of the motor. The rate of power development per piston displacement in its nature is equivalent to the motor torque, and therefore the minimum of fuel consumption will be reached where the reciprocal influence of developed torque and thermal efficiency marks the most favorable conditions for the motor action. This can be shown in form of an equation:

$$f = P \times \frac{T}{E \times R}$$

where

f is the fuel consumption per horsepower,
T is the developed motor torque,
E the thermal efficiency,
R is a factor representing the rate of torque development,
and P a sign of proportionality.

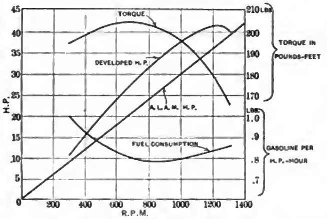

Fig. 2

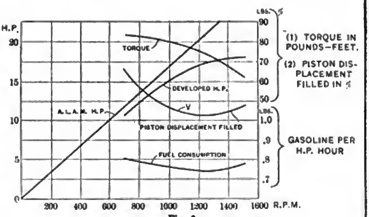

Fig. 3

In further explanation of this equation, the point of maximum torque indicates the moment when the best rate of power, that is, torque development, is obtained, notwithstanding that at this moment the absolute amount-volume of fresh charge used per motor stroke might be smaller than at lower revolution per minute. Thus is gained a point relatively in favor of the motor economy at this moment, but to find the actual value of the latter the influence of the thermal efficiency must be introduced. The maximum thermal efficiency of a gas engine is generally found at considerably higher revolution per minute than those of the greatest torque, and this brings the question of least fuel consumption together with its corresponding revolution per minute to the matter of finding the point at which the influence upon it caused by the decreasing torque is equalized through the rising thermal efficiency.

THE volume of cylinder filling by fresh charge during one cycle period is closely interconnected with the engine's pressure diagram, it being supposed that the engine has reached the stationary state of its thermal balance, that is, its cycle heat exchange. The cylinder filling is likewise interconnected with the developed motor power and torque, the latter being equal to the mean diagram pressure, times the piston area, times the crank radius, times the mechanical efficiency of the motor. In most well-proportioned automobile motors the maximum torque is developed at very slow speed, the slowest at which the motor will run under full load. However, many features of motor construction, parts alignment, carbureter action, timing, etc., affect this in one way or another so that the point of maximum torque cannot actually be foreseen even approximately. As mentioned, the heat losses occurring during an engine cycle are considerably higher at slow speed, which reduces accordingly the thermal efficiency and the rate of power production per contained amount of fresh charge in the cylinder. If no heat were lost through the cylinder walls, the greatest pressure diagram area of the motor working cycle would be reached at the moment of greatest cylinder filling, perfect earburation of gas mixture being assumed. But on account of the existing loss of heat this greatest area is located at certain higher revolution per minute when the length of time per motor stroke, during which the cylinders are exposed to the charge, is reduced. This time should be reduced enough so that notwithstanding a less complete cylinder filling at the higher speed, the most favorable conditions of generating power from the explosive charge are had. These conditions are seldom obtained in practice. They require that the motor deliver considerable work at a low speed, when the latter does not influence appreciably the volumetric cylinder filling through choking in the intake valves and passages. In fact, the slowest obtainable motor speed under load with full-throttle opening would lie most often above the revolution per minute at which the rate of reducing the heat losses equalizes the rate of volumetric filling decrease with rising speed. In Fig. 3 is represented a curve giving the change of piston displacement filling in the test of the Franklin engine, showing a very abrupt drop from the lowest speed on. In such motors the greatest area of the pressure diagram will nearly coincide with the moment when the best cylinder filling is obtained during actual running, because, in other words, the volumetric filling decreases so rapidly in the practical range of lowest motor revolution per minute that it would not be possible to offset it by the simultaneously decreasing heat losses.

WHEN considering the cylinder filling purely theoretically, as the result of filling a compartment under influence of a pressure difference created by the suction action of a piston, the greatest volumetric filling corresponds to the lowest recorded motor speed. However, if a true reproduction of the motor performance is desired, certain practical points which might alter the former theoretical result must be introduced. One must separate the meaning of actual volumetric cylinder filling, which refers only to volume, from the best cylinder filling, as mentioned in this article. The second meaning is intended to denote not only the volume of gas freshly taken into a cylinder during the inlet period, but also this volume adjusted according to the state of the air and gasoline mixture in regard to the capacity of power development by this latter. Although the greatest measurable volume of air and gas would be drawn into a cylinder at the lowest speed, the conditions of the air, of the gasoline, of the earbureter adjustments, etc., may be such that the most effective mixture consistency, considered from the point of power development per unit of volume, would appear at a somewhat higher revolution per minute. Consequently the point of the best cylinder filling would lie somewhere between the lowest obtainable motor revolution per minute and the revolution per minute at which the best mixture consistency is reached. Its location marks the point at which the decrease of volumetric filling is counterbalanced by the improvement occurring in the mixture quality. Moreover, the condition of some of the motor parts might exert an influence on the moment of best cylinder filling, deduced as the result of apparent power generating, when, for instance, leaky places around the valves, pistons, etc., permit the escape of a larger amount of gases at slower speed.

The actual volumetric cylinder filling is represented by a curve which has a maximum at the slowest motor speed, gradually decreases up to certain much higher revolution per minute, and then begins to rise slowly again, see curve V in Fig. 3. This last rising part of the curve can be explained partly by the inertia of the gases acquired during the suction stroke, the inertia increasing rapidly with the revolution per minute. After a certain speed is reached the gas velocity is so high that a larger amount enters the cylinder during the latter part of the suction stroke; then the decrease is effected through greater throttling of the gas flow due to higher velocity. This would become particularly noticeable at high revolution per minute in motors with late inlet closing, and also in motors with earlier inlet closing, when their inlet valves are small and choke the passing gases considerably. Curve V, Fig. 3, can also represent the elapsing of the best cylinder filling with the motor speed; in other words, this latter filling coincides with the volumetric one, when assuming that the carbureter delivers a mixture of best consistency from the lowest motor speed on, and that the motor itself is in good condition throughout. In practice these conditions are generally attainable.

WITHIN practical limits the coefficient of friction generally decreases as the motor runs faster. Another item to be included in the mechanical motor losses is represented by the power required for driving the air fan, the oil and water pumps, the magneto, etc., which always increases with the motor speed. Whether the resulting percentage of total mechanical losses in a motor will increase, remains constant or decreases with the gain of speed depends on the relation between the above-named kinds of power losses.

The pressure diagram area will almost always be reduced at higher speed, and therefore the point of maximum torque lies at higher revolution per minute than the area maximum for the case when the percentage of mechanical losses is decreasing at rising speed; the exact location of the point would be where the decrease of diagram area is equaled and compensated by the simultaneous decrease of mechanical losses. On the contrary, should the percentage of the latter represent a value increasing with the motor speed, the maximum torque will be at the point of greatest recorded diagram area, assuming that this corresponds to the lowest speed the motor is capable of under full load.

(To be continued.)

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CONTENTS

Truck Operation in the Twin Cities—Part II 5
The Trend of the Times in Truck Work—Part VII 14
Protection of Trade 17
Motor Trucks in the Army Manoeuvres 18
Mileage Service Received from Solid Tires—Part II 24
The Editor's Viewpoint 26
Which is the Better Method of Truck Control—Left-Side or Right-Side? 28
Activities in the Motor Truck World 36
Conditions of Trade 38
Among the Makers 39
How the Dealer Looks After the Owner 40
Municipal Service Extensions—Fire Apparatus Cost 44
Three Blair Trucks 48
The Stewart Vehicle 49
Developments in Construction of Front and Rear Axles and Springs—Part II 50
Cross-Continent Trip 54
Commercial Car Questions Discussed 56
The Motor Tractor 58
Horsepower and Gear Ratio in Trucks—Part II 60
Trade and Personal 62
Truck Market Possibilities for American Makers 62
Commercial Vehicle Incorporations 64
New Commercial Vehicle Agencies 65

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The Autocar

Read the following experience of Albert Hansell, a well-known fruit grower of Burlington County, N. J.

Mr. Hansell, who lives four miles from Burlington, and sixteen miles from Camden, bought an AUTOCAR in February, 1911. It is equipped with an open body which carries 108 five-eighth bushel baskets. In speaking of the results from his car, Mr. Hansell says:

"I regard my AUTOCAR as of the utmost value to my business. It has exceeded my highest expectations in its ability to transport my produce promptly and efficiently, and its economy over horses.

"The AUTOCAR is able to make a trip to the Dock Street produce merchants and return in three and a quarter hours. This is a distance of thirty-two miles, not including the ferry trip across the Delaware River. It takes a team of horses four and a half hours to go to Dock Street from my farm. An hour is then consumed in feeding the horses, and four and a half hours in the return trip.

"This is a total of ten hours for a team of horses as compared with three and a quarter hours for the AUTOCAR, and not many horses are able to make the journey in ten hours. It has to be an especially good team to do it in that time, and the horses are then down and out, while the AUTOCAR can make four such trips per day, if need be.

"From my observation of large trucks in the possession of other fruit growers, I prefer my 1½ ton truck. It gets about quicker, and easily makes up, in number of trips, for its smaller capacity. Moreover, country roads are hard on the big trucks. They do not work to advantage unless on paved streets or macadam highways that are in perfect condition. The AUTOCAR seems just suited for the average country roads. After more than a year of hard service, my car is in excellent condition. The Engine is running fine, and gives me no trouble whatever."

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The Commercial Vehicle

Vol. VII September, 1912 No. 9

Truck Operation in the Twin Cities Systems at Minneapolis—Part II

A Complete Analysis of the Transportation and Delivery Conditions in Minneapolis, Including a Thorough Survey of Motor Truck Work In Local Delivery and In Interurban Service with St. Paul

THE August issue of the "Commercial Vehicle" contained a comprehensive summary of delivery conditions in St. Paul; there are 146 motor trucks and 6011 horses in that city. Minneapolis, much further advanced in the way of up-to-date transportation facilities, has 313 motor trucks in active service; actual facts and figures and conditions of delivery are specified below.

THERE are 313 motor trucks in use in Minneapolis and 8,000 horses.

Ninety-five per cent. of the local delivery is within a circle of 4-mile radius.

Over 1,000,000 pounds of freight is hauled daily by motor truck over the chief connecting street between Minneapolis and St. Paul, and 2,500,000 pounds by horse vehicle.

Two hundred motor trucks cross the railway midway between these cities every working day.

Minneapolis contains 53.22 square miles of territory, well laid out with good streets, level for the most part and well kept. The general shape of the city is rectangular with the greatest length north and south, the boundary of St. Paul adjoining on the east; the business centers of the two cities are but 10 miles apart.

The rectangle forming Minneapolis is divided diagonally by the Mississippi river, running in a general northwesterly direction, and for a distance of 3 miles forms the boundary between the two cities in the southeast corner of the rectangle, as shown on the map reproduced on page 6.

The two cities are further divided by railway transfer yards located just over the line of the eastern boundary of Minneapolis and between the cities, running north and south. There is but one bridge crossing this maze of railway tracks so that all road traffic between the city centers is forced to come over this bridge, making University avenue the connecting street between the business centers.

TRUCKS IN MINNEAPOLIS.

Van and transfer	39	Undertakers	5
Groceries	22	Decorators	4
Liquors and brewing	19	Creameries	3
Commission	20	Bakeries	5
Lumber	15	Water delivery	3
Meats	16	Agricultural implements	5
Hardware	11	Bus and passenger	3
Furniture	9	Coffee	2
Department stores	9	Plumbing and heating	2
Fruits, etc.	10	Flour	2
Candy and confectionery	5	Glass	2
Dyers	5	Miscellaneous manufacture	55
Laundries	7	Unlisted	30
Deliveries (contract)	5		
		Total	313

As a previous article has discussed conditions in St. Paul, it is the aim of this to take up Minneapolis conditions and the status of interurban delivery found in the conveyance of freight between these two cities, with descriptions of truck systems and lack of systems now in vogue in this Minnesota double community.

Important at the start are several general conditions under which all motor vehicles in this locality must operate and which are worth noting at this time: Mechanically speaking, a motor truck that can successfully operate in the Twin Cities the year around can be sure of mechanical success in any other place. To operate successfully, a machine in the Twin Cities must be able to run at a temperature of 40 degrees below zero and through 4 feet of snow, or not be hindered 6 months later by 10 inches of mud or 100

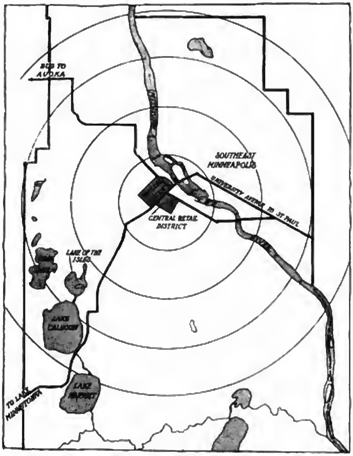


Fig. 1—Diagram Showing Central Retail District and Environs of Minneapolis

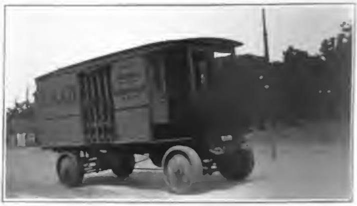


Fig. 2—Couple-Gear Truck Used in Interurban Transfer Work Between Minneapolis and St. Paul—a 10-Mile Run

degrees of heat. Working in St. Paul, it must climb long and steep grades, mounting a hundred feet within two blocks distance perhaps, and then, after passing over University avenue to Minneapolis continue its work on level streets with a greater demand for speed.

In St. Paul it must compete with 2-horse teams carrying an average 2-ton load, in Minneapolis with the same class of draught animals hauling more than a 3-ton load.

Such are the mechanical features which the motor truck must overcome, but there are service features even more important.

St. Paul is largely of German and Irish population so far as the big foreign element goes, and is more conservative than Minneapolis. Before putting a motor truck to work, or thinking of purchasing one, the average merchant in St. Paul plans out a whole campaign and system of use to make the machine bring in actual dividends. The foreign population of Minneapolis is largely Scandinavian, though the business of the city is controlled by Americans. The Minneapolis merchant wishing to be thought progressive and up to date buys a truck as a sporting proposition and finds out later whether he can make it pay.

This has been due in Minneapolis very largely to the selling policy of one firm which very early in the motor-truck industry thrust upon the Minneapolis merchants a ruinous selling policy, more the result of ignorance on the part of these special dealers than intent, but none the less harmful in its influence. Influential as this firm was it sold to friends and others motor trucks of varying capacity with but little if any reference to service conditions, selling on the basis of touring car salesmanship, describing mechanical details, stating how many miles an hour the machine would make, boasting that its 3-ton machine would do 30 miles an hour. The result has been that a score of Minneapolis firms now using motor trucks consider them a white elephant on their hands, while this same firm is reaping the benefit of its high repair costs.

Such a condition cannot last, it is true, for as soon as men understanding motor-truck operating systems and delivery engineering enter the field in Minneapolis—and there is a field for such there—just so soon will successful operation of trucks be the rule, and these scores of dissatisfied users turned to enthusiasts when they are shown by a competent man that it is not the truck but the system of use which determines success.

St. Paul, having to be shown first before buying motors for delivery, is already convinced, while Minneapolis, though earlier to start and more receptive, is still for a large part waiting to be sure. This does not mean that there are no machines doing successful work in Minneapolis, for there are scores, but that there is too large a percentage of doubtful ones considering the opportunities for truck work in this city.

Florist Delivery Vehicle Travelled 7,698 Miles in 1911

Donaldson's Glass Block, one of the largest department stores of Minneapolis and in a central location, is using three electric trucks in its delivery work and one 1-ton gasoline car. One electric of 1,500 pounds capacity is used for florist delivery work, averaging 25 miles a day. It traveled 7,698 miles in 1911, working 305 days, and delivered 16,778 packages. This car was fitted with lead batteries and was idle from 1 to 2 hours a day. While not considered a success financially the firm is not dissatisfied with its work on account of extra service gained. It is doing the work of two horse outfits.

A second electric of 3-ton rating is used for suburban delivery to St. Paul. The interurban run of 20 miles is accomplished with deliveries between the hours of 9 a. m. and 2 p. m., after which shorter trips in local delivery are made. This machine in a year's work ran 272 days, averaging 38.1 miles per day, covering in all 10,375 miles and delivering 28,535 packages. No figures on costs were available.

The third electric, a smaller vehicle used in the congested downtown district and used for a shorter time, in 190 days of running delivered 40,308 packages.

The 1-ton gasoline car in 180 days of running averaged 46.6 miles a day, delivering 20,703 packages.

The average for horse trips per day is 14 miles.

All motor truck delivery with this firm to date has been more or less perfunctory. The times demanded trucks and they were put to work, but little thought was expended on them or little real study spent on their cost figures with the idea of working out systems to better service and lower cost. Of late, however, as the motor truck idea has grown this firm has been figuring more closely, and as a result is planning somewhat of a reorganization of the whole delivery system on the basis of smaller delivery units traveling faster.

Flexibility of 1,000-lb Motor Vehicles

The manager figures that by purchasing a number of small 1,000-pound vehicles on pneumatic tires five of these vehicles can be bought for the cost of one of the electrics now in use and be much more flexible in operation. "I can write those small cars off the books at the end of three years' service and still be ahead of the game," said he, "but I figure that they will do considerably more than that."

Falchoner's laundry of Minneapolis is using a 1,500-pound electric delivery wagon for its delivery service. The Nevins laundry and the Art laundry also use motors, all progressive and up-to-date in equipment, and vying with each other for the best trade. The Falchoner firm averages 30 miles per day with its machine, making 108 to 150 stops, the machine taking the place of two 1-horse wagons. The average load is 1,000 pounds. The vehicle has been in use for 2 years and is still fitted with the original set of tires which are good even after 10,000 miles. The speed of this vehicle is low, about 15 miles an hour.

The average stop was given as 1.5 minutes, which with 125 stops would make a daily idle time of 3 hours. Since the machine operates from 6.30 a. m. to 8.30 p. m., 14 hours, this would leave 11 hours for running. The 30-mile-a-day mileage can be accomplished in 2 hours at the vehicle's speed of 15 miles per hour or in 4 hours, say, in congested traffic, which leaves 7 hours unaccounted for. Three hours of this may be spent in loading, but even this would leave 4 hours unaccounted for. The average stop, therefore, must be more nearly 3 minutes than 1.5. Three minutes per stop would occupy 6 hours of the day, leaving 8 hours for loading and running. Four hours actual running in traffic leaves 4 hours for loading, which may be more nearly correct than the figures furnished.

Possibly if this and other laundries would send a man out on a trip and check up actual loading and unloading times and the length of stops, the figures might show some facts most interesting to their monthly balance sheet, and a better basis for cost figuring than guess work by the driver or from an office desk. There is need for accurate knowledge on these points by every firm using motor trucks.

Northeast of the Mississippi river is a triangular residential section which in spite of its location is known as Southeast Minneapolis. Here, on the banks of the river, is located the University of Minnesota, the fourth largest university in America with some 1,500 students. These, being residents of Southeast Minneapolis for about 9 months of the year, live largely in boarding houses, or room at private homes and take their meals at restaurants, making the grocery business of this section peculiarly inviting. Located near the university grounds and close to the restaurant district is the grocery of C. W. Meneilly, which store furnishes not only the university and restaurant trade near the school grounds but a large residential part surrounding, the area covered by the Meneilly delivery being about 2 square miles. With the growth of business and the adoption of motor trucks by downtown stores this firm found that a new method of delivery was necessary to hold the trade and furnish the service that the downtown stores 3 miles away were able to furnish in this district. The

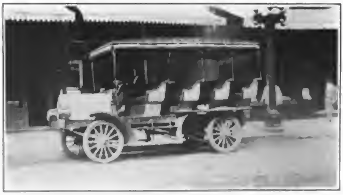


Fig. 3—Twitchell Sight-Seer in Operation on Minneapolis Boulevards. In the year 1911 This Car Covered 35,000 Miles and Carried 4600 Passengers

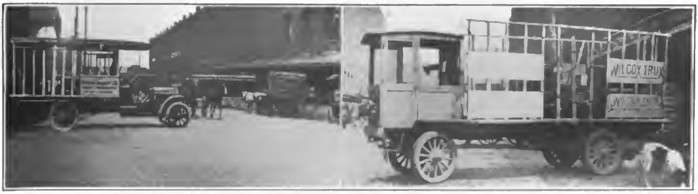


Fig. 4—The Left-Hand Picture Shows Commission Row, Minneapolis, at a Quiet Hour; the Right-Hand Picture Depicts a Wilcox Truck on Commission Row Hauling by Contract

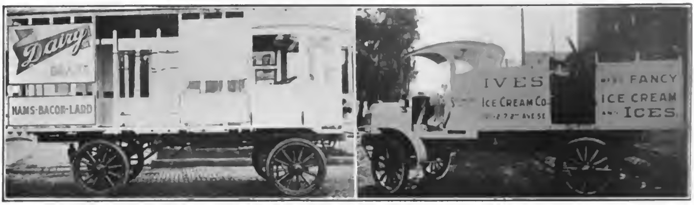


Fig. 5—The First Picture Shows a Wilcox Truck Used for Dairy Delivery; the Second, a 1-Ton Wilcox, Used by the Ives Ice Cream Co., Having a Special Body Equipped with Drain Pipes

result was the purchase of a 1-ton commercial vehicle.

This machine now does 50 miles per day in delivery work. This is nearly all to separate houses as there are no apartments, unless fraternity houses may be put in this class. The district is closely built up and stops are near together. The truck is doing the work of three 1-horse wagons, having put two out of commission. The truck holds 90 folding grocery delivery boxes such as are used by all Twin City grocers, while the horse rig carried but 60. The use of the truck has in 4 months increased business 15 per cent. Beside the delivery work the machine hauls loads from the market across the river every morning, delivering to two stores. One motor truck and two men do this work which formerly took four men and two wagons.

Mr. Meneilly is very enthusiastic over the success of the motor truck which seems to fit well into his present system, and plans adding to the one he has in the near future. While the machine now working is doing well no cost was figured out neither was there any special account taken of length of stops or idle time. The firm is fortunate in the size of vehicle it picked out for its service.

The Delicacy Bread Co., Minneapolis, is using five 1,500-pound electric cars in its bakery delivery. It owns as well four 1-ton gasoline cars which it is not using. The electrics average 24 miles a day, with a 600-pound load, making 50 to 75 stops per day. Each truck has displaced two 1-horse rigs. Stops in delivery are short, on one occasion a run of 24 stops having been made in 1 hour even. Inquiry was made of the driver of one of the cars as to idle time during the day, which for his car was given as 6 to 7 hours out of a 12-hour day. Loading time averaged 1.5 hours, often more.

Idle Time Can Be Minimized to 2 Hours Instead of 6

It is easy to see the loss in this idle time. A 4-hour loss for each car—for 2 hours should be sufficient at the very most for loading three 600-pound loads—with five cars means a loss of 20 hours' service a day, or in fact the loss of the work of two trucks on a 10-hour-a-day schedule. In other words, if the loading and unloading time were speeded up, by a cheap boy, for instance, to bring idle time down to 2 hours a day instead of 6, the present five trucks could do the work of seven machines at no extra expense to speak of. The loss with this service at present, taking the cost of operating a 1,500-pound electric at $6 a day, would be $12 per day. One can run a 3-ton truck 50 miles a day for that.

However the extra service being gained makes the present machines a paying proposition. With more thought spent on their use the profit could be very much increased and the service as well.

A typical day's work of one of these trucks is as follows:

Early morning trip	18 stops
Late morning trip	24 stops
Afternoon trip	6 stops

The New England Furniture & Carpet Co. has in use three 2-ton gasoline trucks and two 1-ton machines. These trucks average 35 miles per day in furniture delivery and from 60 to 80 stops. They operate from 7.30 a. m. to 6.30 p. m., and are idle at the store 3 hours a day.

As an illustration of how greatly guesswork enters into the service conditions of truck use in this locality it might be mentioned that the average time for each stop was given as 10 minutes. With the minimum number of stops given as a daily average a 10-minute stop would mean idle time, during the day, of 10 hours, which is apparently wrong. On checking up it was found that 4 minutes was nearer the actual time consumed at each stop, although stops of a half hour are made almost every day.

The average loading time is 1 hour.

In spite of a hit-and-miss system of operation the trucks are paying, lessening the delivery costs over horse outfits. Also long hauls to suburban points are made, such trips often covering 50 miles. One of these trips to Lake Minnetonka, a summer resort section about 20 miles out from the city center, was made four times a week by one of the trucks. The horse average in the work of this firm was 15 miles per day, the horses being shifted about and working but 5 days a week. These took 2 days for a lake trip. On Tuesdays and Fridays the company delivers to St. Paul making a round trip of 40 to 50 miles.

Tires are guaranteed for 5,000 miles, but run from 8,000 to 10,000 miles; the rears lasting between 7,000 and 8,000 miles and the front tires a clear 10,000. The firm is well pleased with the work the machines are doing and is beginning to see the need of more system and method in their handling.

The W. K. Morrison Hardware Co., while enjoying the superior service resulting from the use of motor trucks, is not enthusiastic about the cost of upkeep and running. Here, again, lack of attention to the problem in hand is responsible for a rap at the machine. Two gasoline cars are in use hauling hardware. One hauls small building hardware, such as nails, wire, rope, tools and the like, and the other the heavier supplies. Each car covers 60 to 70 miles per day with 6 to 8 stops, averaging 10 to 15 minutes. A certain Chicago hardware firm failed to make motor trucks pay on account of the idle time taken up by the driver by getting receipt for his load, he having often to mount a ladder up to the top of a 5-story building to hunt the contractor, only to wait while he finished the job he was at before he would go down and check up the shipment. With the Morrison Hardware Co. anyone on the job can receipt for the load and thus much time is saved. Cars are never overloaded and yet repair bills are very high. The reason was very quickly understood when the speed of the cars was put at 30 miles per hour. Such speed for a 2-ton truck on hard tires will wear out any machine, and it is no wonder that the cars were spending a fair part of their time in the repair shop. On stating that the drivers should have known better, it was answered that they couldn't expect much more as drivers were paid only $12.00 a week and you couldn't expect much for that. In fact, they had no trouble getting men at that rate who could drive a truck.

Money, no doubt, was saved by hiring cheap drivers, but repairs were climbing up to an average of $75 per month per car. A few dollars more to hire a real driver who understood what kind of care a truck needs would have saved two-thirds of that monthly repair bill. The cars at that are making good, but how much better they could do if they only had a chance! This is not a criticism but a suggestion.

The motor truck proposition is so new in the Twin Cities that it is not taken as seriously as it deserves. Motor truck users, by getting together, comparing notes and keeping up to date by reading the latest developments of the truck-operating industry, can save many a dollar in a year's business of delivery. Concerted action can change downtown receiving conditions and bring about many reforms in the handling of delivery traffic more necessary as motor trucks increase in number. With the progressiveness of Minneapolis behind it moves of this kind are to be expected.

The Morrison trucks operate from 6.30 a.m. to 6.00 p.m., with 1 hour's rest at noon. Deliveries are made daily to St. Paul—10 miles—to St. Louis Park—7 miles—and to Hopkins—11 miles, on the Minnetonka road.

The one truck in this work takes the place of two 2-horse teams.

The repairs, as stated, amount to $75 per month. Tires, also on account of the excessive speed, last but 5,000 miles. There has been but little study of their operation or attempt to make them do other than fill a niche left empty by horses; no change of system to fit the new method. Plans are under way, however, for a complete reorganization of the use of these machines.

Motor Trucks in Minneapolis Lumber Service

The Thompson-MacDonald Lumber Co. features motor trucks in its advertising along with the caption, "One piece or a car-load," as a criterion of service. Very naturally it costs more to deliver one piece by motor truck than by horses for average conditions, though in carload lots the truck should show up well. As a feature of service the trucks are all right, but in reporting on their work the truck again gets the blame in the statement: "In 3 years' time we handled 500,000 feet less lumber per year at $1,400 greater expense per year than with an all-team equipment previous years." The matter of comparative expense does not show in favor of motors. It is the system, however, that makes a truck pay. Further data have been requested to throw further light on the reason for the extra cost and less tonnage of the motor truck, which will be published in a later issue. The firm is now using one 3-ton and one 1-ton gasoline truck.

The John Luxem wholesale meat market of Minneapolis keeps two 2-ton and one 1-ton gasoline trucks in service for the delivery of meats. All the delivery work of this firm is done by motor trucks, these covering more territory and taking the place of seven horses formerly used. Each truck makes a daily run of close to 70 miles. **Fifteen stops are made per trip, each of 4 minutes, making the idle time of a trip an even hour. The machines are loaded in 20 minutes, as a rule, the load being ordinarily about 3,800 pounds. Overloads are rare. Tires give exceptional service, lasting for about 10 months, both front and rear. Each truck does the work of more than two teams, and altogether they are a financial success as well as a service success, and most satisfactory in every way. The**

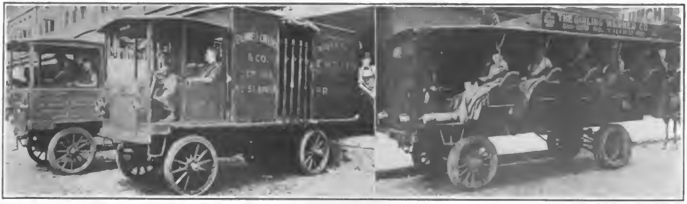


Fig. 6—Truck Used for Delivery of Fruits and Produce, and Wilcox Truck with Sight-Seeing Body Acting as Passenger Car Between Minneapolis and Anoka, Minn., About 20 Miles North

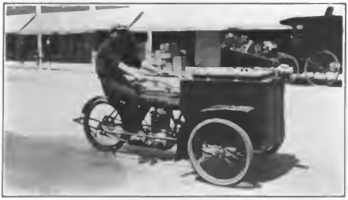


Fig. 7—Motor Tricycle Used for Local Delivery by the Minneapolis Dry Goods Co., Taking the Place of One 1-Horse Vehicle in Rush Delivery Work, and Covering 30-60 Miles Per Day

2-ton machine has been in use 3 years, the 1-ton is in its first year.

Having used trucks for this length of time this firm appreciates the importance of eliminating idle moments, as will be noted in the loading time and the length of stops. It is to watchfulness in this regard that success with a motor truck is due.

The Crescent Creamery Co., Minneapolis, has in use one 1,500-pound pneumatic-tired delivery wagon and one 4-ton machine. The small truck is doing the work of three teams and the large one of four teams. The small machine averages 80 miles per day; the large 30. Tires are guaranteed to 5,000 miles.

Grinnell, Collins & Co. are using two 1.5-ton trucks, one 1-ton and one 3-ton in commission work. The 3-ton machine is doing the work of five horses, averaging 40 miles per day. Motor trucks have been a great success with this firm.

Brooks Brothers Lumber Co. is using a 3-ton machine. This averages 55 miles per day, on an ordinary run of 24 miles. It takes the place of four 2-horse teams. Tires last from 6,000 to 7,000 miles.

A check on trucks standing at Commission row, Minneapolis, resulted in the following:

1500-pound capacity trucks	1
1-ton capacity	5
1½-ton capacity	2
2 ton capacity	4
3 ton capacity	10
Total	22

The Minneapolis Dry Goods Co. is using one 3-ton motor truck for its larger hauls and larger loads, though no figures as to its operation are available at present. A unique feature of the company's quick-delivery system is seen in the use of a three-wheeled delivery vehicle or tri-car of motor-cycle type. This machine with small loads is capable of very quick trips, is handled by a boy, and, fitted with a two-speed gear and clutch, is capable of meeting almost any road conditions. This machine runs winter and summer, covering 35 to 60 miles a day.

The Twitchell Sight-Seeing Bus

A common sight on Minneapolis streets during the tourist season is the Twitchell sight-seeing bus, which has been in use for this type of passenger, hauling over the boulevards, for 4 years. During this time the bus has covered over 35,000 miles, making four trips of 18 miles each day, operating 4 months per year. The load is fifteen passengers. A second car holding twenty persons is used for 3 to 4 months each day during the rush times and for charter work. During the past year these cars carried 4,600 passengers, 1,840 on the small car and 2,760 on the large. The owner takes care of his own car, garaging and repairing them himself and acts as his own driver on the small car when it is in operation.

The cost of operating the machine, all included, is 15 cents per mile.

To make the machine pay in winter months a truck body is fitted and contract freight hauling done between the two cities.

The Boyd Transfer Co. uses one 5-ton, one 1-ton, two 3.5 ton, one 1.5 ton and two 2.5 ton motor trucks in hauling transfer and moving work. These machines all make 30 to 35 miles per day with fifteen to thirty stops. They serve three warehouses located in different parts of the city and are operated with the view of keeping them loaded both ways as far as possible. Two to four trips a week are made to Lake Minnetonka and lake points near, a run of 20 miles each way, hauling household goods and freight. The loading time for the machines is 1.5 hours, and in moving work the same time is taken for unloading, so that they are only used with success on the long hauls. Minnetonka trips take from 7.30 a.m. to 2.30 p.m. Moving is also done to Stillwater, 20 miles beyond St. Paul, one to three times a month, a trip of about 20 miles, 4 hours being taken in the journey each way. The firm does its own repair work at its own garage and at night garages an average of 10 cars.

Motor Fire Apparatus in Minneapolis

The Minneapolis fire department is equipped with four combination hose and chemical trucks, with three more on order. A combination hose chemical and pumping engine is also being built, making 7 motor vehicles in all. The fire chief uses a seven-passenger car, and four runabouts are used by his assistants.

The use of motor apparatus to date has resulted in a saving over horse arrangements formerly used of 40 per cent. of the upkeep cost, and it was stated that if the whole department were motor equipped at once the installation would pay for itself in 5 years, on the maintenance figures alone. Machines stand idle 23 out of the 24 hours. Motors at present are assigned to those engine houses having the most long runs.

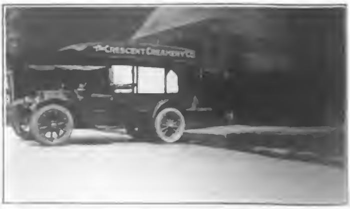


Fig. 8—Motor Vehicle Used by the Crescent Creamery Co., of Minneapolis, for Local Delivery; the Truck Makes 80 Miles a Day and Does the Work of 3 Horse Teams

The most interesting motor truck possibility in the Twin Cities lies in the development of interurban traffic between the two cities. Over $1,000,000 per year is spent in freight hauling over the main connecting street between these city centers, 957 horses being engaged daily in this work, and at present, according to a traffic census recently made, 118 motor trucks.

Of the 1,630 vehicles passing between these cities every day 60 per cent. is motor traffic—not including street cars.

Fifty per cent. of these vehicles carry freight and merchandise, and 29 per cent. of these freight vehicles are motor trucks, which alone carry per day 1,120,000 pounds of commodities.

The Trend of Interurban Traffic

To get a view of the general arrangement and trend of this traffic imagine two circles of 5.5-mile radius each, with their edges overlapping at one point so that a straight line drawn connecting the centers of the circles will be 10 miles long. This line runs east and west. The overlapping area is called "Midway." The circle on the west is Minneapolis, that on the east, St. Paul, and the line connecting the city centers is the main inter-city thoroughfare, University avenue. It is over this street that 95 per cent. of the merchandise transported by road between the two cities passes, the amount of this traffic being estimated above. This estimate is based on a census of traffic and actual figures, combined with figures on loads and costs previously worked out.

The following traffic census was made of machines passing Lynhurst avenue, half-way between the city centers on June 13 last:

	Motor trucks.			Wagons.		Passenger vehicles.		
Time	1-ton	2-ton	3-ton and over	1-horse	2-horse	Buggies	Street cars	Motor cars
8:00	1	3	4	8	14	0	17	5
8:30	0	0	3	7	8	0	22	18
9:00	1	6	4	10	12	3	18	12
9:30	3	4	5	4	9	3	16	20
10:00	3	3	5	9	12	2	15	19
10:30	1	0	8	11	12	2	16	14
11:00	1	6	3	7	17	0	16	16
11:30	3	0	5	3	17	2	15	14
12:00	1	1	3	3	7	3	16	19
12:30	1	1	4	5	4	1	14	17
1:00	1	1	6	4	17	1	15	28
1:30	6	1	8	2	27	2	14	28
2:00	5	2	4	8	16	6	14	34
2:30	0	3	2	16	10	5	17	34
3:00	2	3	8	7	21	8	13	43
3:30	3	1	4	13	17	3	17	49
4:00	2	2	4	7	16	1	21	40
4:30	4	2	4	15	22	4	24	44
5:00	4	3	5	14	25	3	26	45
5:30	5	5	8	16	22	5	24	49
6:00	6	7	7	18	21	4	23	53
6:30	4	3	5	12	20	5	22	50
7:00	2	2	3	9	14	4	20	47
7:30 to 8:00	1	2	3	7	11	4	29	38
Totals	60	61	115	215	371	71	444	736

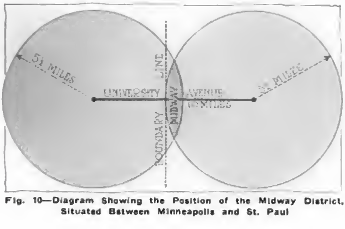


Fig. 10—Diagram Showing the Position of the Midway District, Situated Between Minneapolis and St. Paul

Fig. 9—One of a Number of Motor Trucks Used by Minneapolis Lumber Firms. Their Success Depends Almost Entirely on the System Under Which They Are Used

Grand total for 12-hour day except street cars, 1,630 vehicles, with street cars, 2,074 vehicles.

Motor traffic 60 per cent. of total road traffic on this street.

Motor truck traffic 29 per cent. of freight traffic.

Motor car traffic 91 per cent. of horse-passenger traffic.

Taking the load of the 1-ton machines as being up to capacity, the 2-ton machines as 80 per cent. of rating and those in the third column, many of which were 3.5-ton and 5-ton machines, as averaging 3.5 tons, the tonnage carried by these machines would aggregate 560, or 1,120,000 pounds per day.

The amount carried by horses is practically twice this figure. Allowing 1-ton for the 1-horse vehicles and 2 tons for the 2-horse, a daily tonnage of 957 is given. It might be remarked here that most of the work loads both ways, so that these figures are fair estimates. The aggregate tonnage of both horse and motor vehicle loads as given is therefore 1,517.

Motor trucks can make 6 trips a day between these cities to horse wagon's one, so that with even equal tonnage capacity one-sixth the number of motor trucks could do the hauling work of the present horse outfits—or 98 trucks could take the place of the 586 wagons in use now.

These, costing $4 per day for single rigs and $6 for 2-horse wagons, bring a daily cost of $3,086 for the number given in the census as engaged in this work.

Ninety-eight motor trucks at $12 per day would cost $1,176, a saving of $1,910 per day, or $573,000 per year.

An Amount Which Is Worth Saving

Such an amount is worth saving even to a double city of 500,000 people, but before it can be done there will have to be a better understanding of what the motor truck and its use means and a reorganization of systems of handling goods to fit the new vehicle.

Even now, however, motor trucks in this work are making a showing close to that given.

The Igo Express Co., St. Paul, operates five motor trucks in inter-city work, using the system of operation given in Fig. 11. In each city is located a freight depot, a small shed-like building, for storing goods out of the weather, having wide doors on either side and a platform. At one end of the building is an office. One depot is located at Midway, centrally between the two cities, at the point in our imaginative diagram, Fig. 10, where the circles overlap. To these depot platforms come horse vehicles with their loads collected locally and these they store in the freight house during the day. The motor trucks are scheduled to make trips between the two cities every hour and they stop at the platform on the opposite side of the building from the wagons, discharging their load at one end of the platform and taking on what the teams have collected at the other. Teamsters help in the loading and then take the load the motor truck has brought to the platform, and distribute in their local territory.

The arrows in the diagram, Fig. 11, show how goods from Minneapolis are distributed to St. Paul, coming into the Minneapolis depot by team, as indicated, passing through the warehouse from the horse platform to the motor trucks. A 5-mile run brings the motor to the Midway station, where part of the load is left for horse distribution in this district, when another 5-mile run takes the motor and its load to the Minneapolis depot, there to be spread out again by horse vehicles. St. Paul traffic is the reverse.

Saving Delays at Unloading Point

By this system trucks are always loaded, always work on a long haul with few stops and with good facilities for loading and unloading.

The telephone enters into the operation of this system largely, and as the number of machines increases it is planned to have a dispatcher similar to a railway operator, who shall handle all truck traffic over the telephone on schedule of delivery. This will save delays at unloading points.

Besides this general inter-city hauling, the Igo company handles a deal of contract work, but this to date it is impossible to systematize enough to make it a huge success. For instance a contract was entered into with a wholesale grocery firm to do a certain branch of hauling. On arriving at the unloading platform there was always an average of eight teams ahead of the motor truck, which had to stand in line and await its turn. These long stops made the use of a truck a waste of effort, and since the firm to which they were hauling would not give preference to the motor in line, the hauling had to be abandoned. The grocery firm is still contentedly losing money on its highly inefficient unloading system without realizing it. With a good arrangement a motor truck could save enough to pay for itself in a short time in their inter-city hauling.

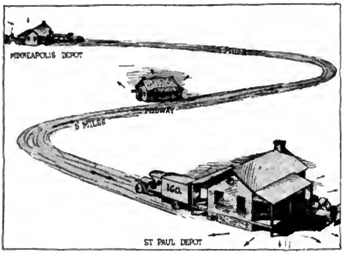


Fig. 11—Drawing Depicting the Distribution System and Route Followed by Trucks Delivering Goods from Minneapolis to St. Paul

There are twenty-five 2-horse teams used by the Igo company in serving the motor distributing depots. On occasion some of these take loads from one city to the other, the trip taking 5 hours, and for hauling the 3-ton load $5 is paid them.

The average freight rate between the cities is $1.60 per ton, 8 cents per 100 pounds, which can be well met by motor trucks., The following tabulation on interurban work, comparing horse and motor costs and figures, explains:

	Horse		Motor truck
Daily tonnage	6		21
Daily mileage	20		60
Daily cost (contract)	$6.00		$12.00
Cost per trip	$3.00		$2.00
Cost per ton-mile	$0.10		$0.06
Ton-miles	60		210
Freight rate $1.60 per ton.			
Cost per ton per trip	$1.20		$0.57
Profit per trip (3½ tons)	$1.20	(3½ tons)	$3.60
Profit per day (2 trips)	$2.40	(6 trips)	$21.60

Igo trucks make the between-city trip in 40 minutes; their horses take 5 hours, including loading and unloading. That six trips a day are possible even with long loading and unloading time is shown in the diagram, Fig. 12. Here the left-hand sketch illustrates the horse trip, first allowing 1 hour for loading, 3 hours for the run over, 3 hours for unloading and loading again, including rest period for horses, and 3 hours for the return. Unloading 1 hour.

Horses could not do more than this, for a 20-mile run such as this is is the maximum of horse effort for a day. Even at this horses are shifted to other routes on following days and when longer trips are made across the business centers horses are changed or 2 days taken. Allowing 20 miles a day is more than fair for horse work; 15 miles is average for a day's work. A 10-hour day is thus taken up in one trip carrying 3 tons each trip.

The diagram on the right, Fig. 12, shows the possible motor truck figures. Thirty minutes are allowed for loading in the morning and 40 minutes for each trip to the sister city. One hour is taken as being amply sufficient for loading and unloading if system is used at all. It could be done in much less. As shown, this would allow the motor to make six trips in a 10-hour day, including loading the machine in the morning and unloading at night.

Excellent Profit on Six Trips a Day

These figures show some of the money-making possibilities of the motor truck in transfer work and long hauling when rightly used. At a cost of $12 per day to operate it can easily be seen that two trips a day of the motor truck would lose money for the user, while with a system which enables it to make six trips a day it can make an excellent profit.

The Igo express company was the first to operate a motor truck in the Northwest, having a White steamer touring car, made over into a truck, in use between the two cities 8 years ago—with but little success. It was used mainly in hauling trunks, six of which made a more than full load.

The first truck in serious hauling was put to work 4 years ago and is still running with as much life as at the beginning.

Pratt's Express Co., St. Paul and Minneapolis, better known as the P. X. Co., has one couple-gear 3.5-ton truck, which often hauls a trailer of equal capacity with full load in the interurban work, one 3-ton, two 2-ton and one 1-ton motor trucks. The system used is somewhat similar to the Igo system. The couple-gear machine has been especially successful in the long Twin City haul.

Ice Cream Truck Makes 50 Miles a Day

The Ives Ice Cream Co., Minneapolis, is using a 1-ton Wilcox truck for their quick deliveries throughout the city and a 3-ton for their wholesale trade. The ton truck is covering, on an average, 50 miles per day, delivering ice cream to forty stores. Between stops this truck is making 18 miles per hour and has replaced six horses. It has proven an excellent investment for the Ives Ice Cream Co., not only from the fact that it is an improvement in their delivery service, but also that it is a fine advertising feature. These trucks are painted white with red running gear and lettered in gold. This makes a striking appearance when coming down the line with a full load. They are regular billboards for the Ives Ice Cream Co.

The Girling-Warner Co. has five passenger cars, the largest car having a capacity of fifty passengers. Three of these are run on street car lines to small towns adjacent to Minneapolis, two cars make four round trips daily to Anoka, 20 miles away, via Robbinsdale, Osseo, Champlin, and one of them morning and evening coming in from Dayton, 8 miles further out. This car makes 96 miles each day over hills and some very rocky and stony roads. The fare to Dayton, 28 miles, is 85 cents; to Anoka, 20 miles, 50 cents; to Osseo, 13 miles, 35 cents. Four round trips are made daily on this line. The running time for the 28 miles is 2 hours and 15 minutes. The other line leaves Minneapolis over the route of the first line as far as Osseo, then branches off west 25 miles, running 38 miles.

One of the cars is used as a sightseer; the leaving time for this car is the same as the leaving time for the regular runs, so this car can be used as an extra in case of trouble on the regular runs.

They are all Wilcox Trux, one 3-ton, one 1½-ton, and three 1-ton trucks. For the work the 1½-ton is the best with a body specially built to carry about twenty-five passengers. The tire expense is the heaviest, and this is on account of the stony condition of the road, the sharp edges cutting up the tires badly.

It is expected that the field will be enlarged next year, five or six more cars being added, so as to thoroughly cover the field. The worst difficulty yet encountered is that of getting a reasonable rate of insurance from the insurance companies, for fire and personal injury, rates being prohibitive.

This story would not be complete without some reference to the street surface of University avenue, the kind of a road over which all of this traffic must operate. The original specifications for the street surface on the St. Paul side of the line, which is the greater part, called for the best of macadam with plenty of foundation. In putting in the road the contractors fell far short of the mark, a fact called to the attention of the city fathers by Assemblyman Kellar at the time the work was being done. For various and divers reasons never made public Mr. Kellar's objection was overruled and he was quite severely handled by that body, for which the people of St. Paul later elected the assemblyman mayor of the city.

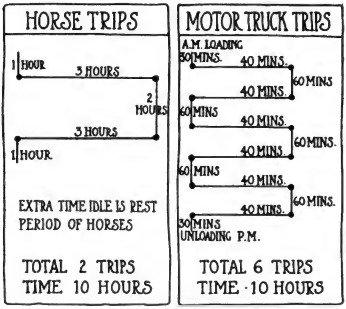


Fig. 12—Charts Illustrating a Comparison Between the Work Done by Horse-Vehicles and That Done by Motor Trucks in Minneapolis

Fixing University Avenue As It Should Be

Under his administration a new city engineer and largely a new body of men have done better work, but lately a commission form of government was adopted by the city to go into effect soon. Thus the political situation has its effect on the thoroughfare between the cities, University avenue on the St. Paul side being a series of hard-edged pot holes and "thank-ye-marms," sometimes filled with gravel as a partial repair and sometimes not, all hindering the efficient moving of street traffic between the cities. The Minneapolis side is a well-kept creosoted block pavement, ideal for the service to which it is put. When the new government comes into effect no doubt one of the first jobs of the new Commissioner of Parks and Highways will be to fix University avenue as it should be.

What is taught from Twin City experience has its application in other places. Too many cities take their delivery work as something apart and do not treat it seriously. Used to inefficiency in horse service they do not realize the efficiency that is possible with the new machines and merely use them like horses. St. Paul is fairly awake on reasons for truck operation and is satisfied with the work motor trucks are doing, while Minneapolis is going hit and miss and is far from satisfied. For this it cannot blame the machines. If these are operated so as to have a chance to make mileage and carry tonnage without hindrance, without overspeeding or overloading, they cannot help but save money and increase business. The Twin Cities need transportation engineers as does nearly every other city which is taking the motor truck seriously.

The Trend of the Times in Truck Work

Purchasing Large Motor Truck Equipments Involves Considerable Forethought; a Buyer, However, Can Purchase With Knowledge by Making a Study of the Following Outlined Analysis—Part VII

When business executives, particularly those in large organizations, have assumed the responsibility of purchasing large motor truck equipments, they are confronted with a many-sided problem which is much more involved than they may anticipate at first sight. The external appearance of a majority of trucks which are now being marketed is so attractive that very little real insight can be gained concerning the value of the equipment without going into a great many details concerning the manufacturing establishment which has produced the machine design upon which it is founded, the character of organization in the manufacturing establishment and the service history of the particular machine in question.

There are no set rules for the determination of what constitutes a good machine against an indifferent one that can be handled by the buyer which will enable him to purchase without error, but our desire is to place before him in a categorical manner a variety of suggestions which will enable him to concentrate his attention in such directions as will develop the good, bad or indifferent features of the truck. Following this idea, we submit the subjoined series of questions and wherever answers are not obvious we offer a few suggestions which may afford enlightenment as to the value of the inquiry.

The Manufacturer

1—*What is the present financial status of the concern in question and the character of its capital? Is the capital speculative?*

A great many automobile manufacturing concerns have had mushroom growth, based upon the belief that very large returns are to be secured, the majority of which have ended disastrously.

2—*Is the capital of an investment character?*

Many of the motor truck producing concerns to-day are constructed upon the most conservative basis as far as financial returns are concerned, with a thorough knowledge that during the preliminary stages of such a young industry profits are not to be expected, but development in the right direction will earn ample legitimate returns on the investment originally made.

3—*What is the age of the concern?*

Has it been in business over a sufficiently long period to command a complete knowledge of the development of the industry, or has it recently sprung into existence based on the hope that it might capitalize to its great advantage on the past experience of others, without sharing any of the financial risk or burden?

4—*Has it been developed entirely for automobile manufacture, or is this line merely an offshoot of an older established business?*

There is a remarkable difference between the concern which gives its undivided attention to the production of motor trucks and that class of institution which establishes motor truck manufacture merely as a branch, with the idea of determining whether it can succeed at it or not.

5—*If strictly an automobile manufacturing concern, was it originally founded for truck manufacture or is truck manufacture a development of previous pleasure car manufacture?*

Many concerns more or less successful in the pleasure car business have looked upon motor truck production as a natural sequence. Sometimes the motor truck is taken up to requite the lost fortunes of a pleasure car venture. Sometimes the motor truck project is undertaken in the belief that there is no difference between the pleasure vehicle and a machine to haul merchandise.

6—*If manufacturing trucks exclusively, what is the magnitude of the undertaking?*

The purchaser is interested in learning whether the manufacturer is making a snapshot effort or is deeply concerned in founding a large, permanent undertaking.

7—*Are the founders experienced in transportation problems?*

The transportation problem is almost as old as humanity and has developed by very slow degrees. Some speculative minds imagine that they can accumulate the entire experience of the past simply by observation and very slight effort.

8—*Is the company part of a large combination of interests?*

If so, it may or may not have advantages. The chances are against it since the problem is so intricate and absorbing as to command complete isolation and concentration.

9—*If part of a combination, what are its antecedents?*

Has it been absorbed for speculative purposes and how long is it likely to remain as at present constituted?

10—*If absorbed, what were the underlying motives?*

Sometimes combinations take place for the benefits arising from co-operative management; sometimes union is a necessity on account of failures and debt.

11—*Has the manufacturer ever been in bankruptcy?*

There are a great many companies whose history has been smothered up by good subsequent advertising.

12—*What influence has any change of organization had on the product?*

Quite frequently the entire character of the machine changes and the older product thus rendered obsolete.

13—*Has the executive personnel changed with the reorganization?*

This is quite frequently the case and it almost necessarily involves a complete change of past policies and practice, perhaps with improvement to the new product, but depreciating the old product in the hands of those who have paid for it.

14—*How have the former users been cared for?*

A good deal can be learned from ascertaining the sentiments of the users of the company's earlier product.

15—*Has the investment of former purchasers depreciated on account of organization changes?*

The responsibility of buying machines which will have a permanent market value demands inquiry in this direction.

16—*If not manufacturing motor trucks exclusively, what is the ratio of the truck business to the older established line?*

Answer to this question will indicate whether the truck line will increase or decline.

17—*How much importance is attached to the motor truck business?*

We frequently find manufacturers largely interested in other lines who undertake motor truck manufacture without believing seriously that the venture is a good one. Consequently, it is usually kept in a state of suppression.

18—*What influence have old business methods upon the new project?*

Occasionally established practice is with much difficulty made to accommodate the new exigencies.

19—*Is the motor truck product marketed through the older sales organization?*

If so, there are many impediments tending to obstruct the progress of the business and the rights of purchasers.

20—*Is the administration sympathetic with the new venture or not?*

This has a remarkable influence on the quality and value of the product and its subsequent development.

21—*Is reputation of old product made to cover defects of the new?*

Advertising has wonderful influences and it should be borne in mind that success in one direction does not guarantee success in another.

22—*How extensive territorily is the organization?*

If it is a national institution its policy and practice are likely to be based on a larger experience than a smaller concern.

23—*Is the motor truck business likely to be dropped if unsuccessful?*

A good deal of danger lies in this direction with large combination institutions.

24—*Is company owned by any trust?*

Sometimes this is advantageous, frequently otherwise.

25—*Is trust influence established to boost the product?*

Experience has indicated that broad and ramifying influences may introduce trucks extensively in spite of any inherent defects.

26—*What, if any, other line of business are owners interested in?*

Valuable inference may be made from information of this character.

27—*Is the company largely in the hands of bankers or stable merchants?*

The permanent stability of the organization is very seriously influenced by the character of its ownership.

28—*Is there likely to be any manipulation of company's securities?*

Such would have its influence on the value and permanence of the product.

29—*Is the business profitable or not?*

Customers may expect treatment accordingly.

30—*Can it live up to its obligations? Is it big enough to be liberal? How do past customers regard its treatment of them?*

The Design of the Truck

A—*Is it strictly a truck design? Is the machine a converted pleasure car?*

There have been a great many compromises whereby touring car parts have been used for freight handling machines with very indifferent results, and it is advisable to ascertain whether the design has been prepared to meet the severe service which truck work demands. There are numerous cases, particularly in small trucks, where the equipment consists almost entirely of touring car parts and the stability of such equipment is questionable, usually resulting in very short life and considerable inconvenience.

B—*On what particular experience is design founded?*

Has the organization had experience enough to thoroughly comprehend the requirements of merchandise transportation service? This is a deep question and experience alone can dictate the course of design to meet the requirements.

C—*Is the truck the handiwork of some reputed genius?*

We have had our Dr. Munyons and Lydia Pinkhams in the motor truck business, exploited considerably in advertising schemes, but few of these cases have remained permanent and steadfast products, hence they should be viewed with caution.

D—*Is the machine an organization development?*

If the organization consists of a group of well-qualified men there is seldom question as to the reliability of the machine.

E—*How competent in design is this organization?*

This question might be inquired into in view of its serious influence on the result.

F—*How often has the design been changed?*

Frequently design changes are evidence of organization weakness and a sure indication of the unstable value of the machine purchased.

G—*Are there many different models?*

Frequently the energies of a manufacturing concern are spread over too broad a field and results are consequently not as good as when the ability of the concern is concentrated on a few well-developed types.

H—*How different are the models?*

If there is no serious difference in design between models there need not be much question about the results to be secured from the machines.

I—*Are there any original or freakish features?*

Novelty is sometimes dangerous and departures from standard practice are to be cautiously avoided.

J—*How many years has design been in use?*

Answer to this question will indicate its stability.

K—*To what extent are stock parts incorporated?*

Stock parts when produced by large manufacturers are even more reliable than parts having individualities and produced by small manufacturers.

L—*How much of the car does the manufacturer make?*

This will indicate how much permanent investment the manufacturer has to assure the customer of his responsibility.

M—*If stock parts are used, how stable are the makers of the parts?*

This is a serious question in view of the necessity for securing renewal parts throughout the life of the machine.

N—*What patent devices are used?*

Special features, unless particularly meritorious, are to be avoided, as they are frequently more expensive than useful.

O—*What imported parts are used?*

The readiness of supply and the cost of parts are involved in the answer to this question.

P—*Is price list of complete parts available?*

Evidence of parts price list indicates that the manufacturer has his proposition well developed.

Q—*What is the ratio of total parts prices to chassis price?*

The present practice tends toward equalizing the total parts prices with the chassis price.

R—*To what extent does design change from year to year?*

Frequent changes, as indicated above, disastrously influence the value of the machine, even rendering it obsolete at an early date.

S—*How soon is the present design likely to become obsolete?*

Answer to this question requires special knowledge of the trend of design and the progressive development of the industry.

T—*To what extent is design fixed by investment in special tools?*

Permanent investment on the part of the producer is a guarantee of reliability to the user.

U—*Are obsolete features being perpetrated on this account?*

Care should be taken to ascertain that the company is progressive enough to make improvements irrespective of its permanent investment in tools.

V—Is design sound enough to make such investment an advantage?

Where the machine is a well developed product this is a guarantee to the user.

W—Is designing department hidebound?

Frequently we find that one influence or another tends to perpetuate a design which has been long since superseded by more progressive purchasers.

X—Is designing department liberal enough to take advantage of the results of operating?

It is becoming more customary to have the operating departments closely confer with designers so that this advantage may be accomplished.

Y—What quantity of unsold product is on hand throughout the organization?

If this is large it indicates stagnation and is not inviting as an investment.

Z—How much influence has this on perpetuating what may be a poor design?

Much unsold stock is quite frequently a serious obstacle to progress.

AA—What is the difference between stated capacity and actual capacity?

It should be remembered that the nameplate does not always indicate the true value of the machine.

BB—How do engine specifications compare with other machines of same rated capacity?

This comparison will indicate the relative performance capacity of the truck.

CC—How do tire equipment, axles, frames, transmissions, etc., compare with other machines of same rating?

Inquiry in this direction will frequently be a guide to the status of the machine with regard to standard practice.

DD—Has the machine any overload capacity?

This factor has a serious influence in placing a truck in one class or another having a higher or a lower capacity than the normal rating.

EE—Are the parts readily accessible and easily removable?

This will seriously influence the cost of maintenance.

FF—Are parts numbered and interchangeable?

This likewise influences the cost of operation.

Organization of the Business

100—*What is the general scheme of organization?*

Information on this subject will generally indicate the business ability of the concern.

101—*Is it a one-man or a departmental organization?*

The latter type is much to be preferred to the former.

102—*How often in the history of the company have the officers been changed?*

The stability of the organization and its product will be largely indicated by the answer to this question.

103—*Is the product sold through branch houses or through agents?*

The branch house gives the user the advantage of direct intercourse with the maker. The agency scheme involves divided responsibility.

104—*How many branch houses are there? How many agencies are there?*

Answers to these two questions will indicate the character and policy of the company.

105—*What changes have taken place in the agencies since established?*

Frequently agencies have a most undesirable and expensive influence on the user.

106—*Are agencies well financed? Have they broad policies?*

These two questions will convey more or less insurance to the user.

107—*Do agents carry trucks in stock?*

If so, their responsibility and reliability is increased.

108—*Do they carry spare parts in stock?*

The influence of this on the user's cost of operation will be manifest.

109—*Have the branches service stations?*

If so, the user's cost of operation is assured.

110—*Are these full-fledged or only pretenses?*

Caution must be exercised as to the real status of service stations.

111—*Must parts be bought through agents or can they be secured direct from the manufacturer?*

The former usually increases the cost to the user.

112—*How far is the factory? How about freight rates?*

These are features which seriously influence operation cost.

113—*What service does the customer get in advance of purchase?*

This will indicate whether the company has a broad or narrow gauged policy.

114—*Are the salesmen boys or men?*

The answer has its obvious indication.

115—*Is any assistance given of an engineering nature to determine proper equipment?*

This is a vital necessity, particularly where a large investment in truck equipment is involved.

116—*Is the product well known and advertised to give it high value as an investment?*

117—*Do used cars command high prices?*

This will indicate the virtue of the investment.

118—*Is the wholesale department well managed so that agents get prompt attention?*

119—*Is intercommunication frequent and satisfactory?*

The service rendered will accordingly be satisfactory or otherwise.

120—*What departmental provision is there for attention to users' mechanical requirements?*

This has a vital influence in securing continuous machine operation.

121—*What is the present tendency of the company's business? Are they progressing or declining? Will it be in business ten years hence?*

Service History of the Machine

200—*How many machines are in use?*

This will determine the status of the organization.

201—*How long are they in service?*

This will show the company's experience.

202—*Are there any large installations?*

If so, the stability of the product is assured.

203—*To what extent are reorders received?*

The indication of confidence will be evidenced thereby.

204—*What particularly influences the sale of the machines? Is it purely merit? Is it purely advertising?*

Answers to these have their obvious value.

205—*Are there any business policies in effect? Are there any trust inflences?*

Replies to these questions will indicate whether the machines are sold on their own merit or not.

206—*Are all machines made still in use?*

This is a vital indication of stability and performance.

207—*Are old machines taken in trade for new ones?*

This practice sometimes covers a multitude of defects.

208—*Do they sell for list or is list discounted for small orders?*

The state of the company's business will be indicated accordingly.

209—*What responsible companies use them in quantity? If new purchases were to be made would they continue to buy the same product?*

The indicated value thereby made evident will be advantageous.

210—*Are there any authentic costs of operation available?*

This will be a final proof of the machine's utility and economy.

Protection of Trade

The Duty of the Government is to Aid and Protect Commerce Carried on Overland Highways

Although such is the duty of the government, it has not as yet constructed or improved any of the interstate arteries of travel.

AS the strength of a nation is often measured by its commerce it is reasonable to expect the government to aid and protect that which gives it a standing among the powers of the world. In the United States much has been accomplished for navigation by motor, but little aid has as yet been extended to that branch of commerce carried on over the public highways, at least so far as the federal government is concerned. It may be said by some persons that the general government has no power to construct and improve the arteries of land travel, but such an assertion is not correct.

The constitution of the United States grants to the federal government exclusive and plenary power over "interstate commerce." No one would say that this clause appertains only to navigation on the water of the United States only. Nothing in the constitution in particular says anything about "navigation," but as the term "commerce" covers "navigation" the federal government has exclusive jurisdiction over travel by water, according to the decision of the Supreme Court of the United States, and the government may legally improve or construct harbors, canals and wharves. Now under congressional legislation no one, not even a state, may erect a wharf or improve or alter a harbor or waterway without the consent of the general government, which is given by the war department. The above is set forth merely to illustrate how absolutely in the control of congress interstate commerce is and to demonstrate the fact that land commerce is as much a subject coming under the jurisdiction of the federal government as commerce on the water.

What Is Being Done for Highway Commerce

Not only has Congress absolute power over the interstate commerce of the nation, but it is under a solemn duty to the people to facilitate and protect this commerce. Congress has spared no effort in aiding navigation. Channels have been dug, lighthouses erected, buoys placed and thousands of persons are in the steady employment of the government who give their entire time and attention to aiding that branch of commerce conducted on the water. Millions of dollars have been spent for lighthouses alone.

What is being done for the commerce conducted on land other than that by the railroads? Has the government constructed or improved any of the interstate arteries of travel? No!

The United States government owes a duty to its citizens to aid the commerce which is now being carried on over the ordinary public highways. Expensive vehicles propelled by power are daily transporting goods over these avenues of travel. The general government has done nothing to aid in the improvement of interstate roads. Roads which would have been blasted out of the path of navigation have been permitted to remain to tear the tires from the land traveler; no warnings of dangers such as would be found on the water highways have been posted and absolutely no attention has been given to furthering the success of that important part of the commerce of the country that is now being carried on overland by the commercial automobile and the motor truck.

The general government has the power. It has the money and owes the duty. Federal registration of motor vehicles undoubtedly will be enacted, not for the purpose of raising revenue or obviating state restriction, but to protect the interstate commerce carried on over the land highways. We will also have legislation providing for road building and improving and such other aid to land commerce as may be necessary. We will not have lighthouses, but we will have danger signs posted at proper places; we will not have buoys, but we will have signs giving directions of travel. We will not have wharves, but we will have emergency stations.

But when will we have these needed aids? Not until Congress is urged to give them to the people. We get nothing without asking, therefore let us ask and be soon about it.

Death of Horses in New York

IN comparison with 1910 and 1911, the death rate of horses in New York City from January 1 to July 20 is not very high, but it must be remembered that this summer has been comparatively cool, with the exception of the first 3 weeks in July.

Figures given by the Board of Health of the city place the number of horses that died between January 1 and July 20 of this year at 10,122, of which 8,942 died before July 1. In 1910, when there was a warmer summer than in either 1911 or 1912, the number of horses that died was 20,552, and the total for 1911 was 19,941, which figure will probably be equalled by the end of this year.

The damage that 2 or 3 weeks of continued warm weather will work with an establishment depending upon horse traction is plainly shown by the fact that during the first 3 weeks of July, this year, 1,180 horses died. It will be remembered that these weeks in July were the hottest this summer.

The average number of horses that died each week from the week ending June 8 to the end of the week ending July 20 was 336.4. The week ending July 13 had the highest rate for any of these 7 weeks, as 489 horses died in that period. The week which ended on July 20 was second in number of horses dying in 1 week, as there was a mortality record of 384 for that week. The week having the lowest rate of any, from June 1 to July 20, was the week which ended on June 15, in which there were 257 deaths.

The only figures obtainable on the number of horses in use in New York give the number as approximately 120,000 in all, of which about 75,000 are used in commercial enterprises. The latter figure seems too low as many more horses are used by contracting and trucking firms, etc., than by private owners. However, figuring on the basis of 120,000 animals in use in the city, there was a mortality of 1 per cent. for the first 3 weeks in July, the hottest period of the summer, and of 8.5 per cent. from the first of the year to July 20. During 1911, working from an equal number in use, the percentage of deaths was 17.13 per cent., while that for 1911 was 16.62 per cent.

Deaths Due to Other Than Natural Causes

It may be that not all of these animals died in service in the streets, but there is no way to ascertain what per cent. did actually die in the streets as when a horse dies in a stable the body is put into the street and left there until removed by the contracting company having charge of that work, under the supervision of the Board of Health. However, in view of the tremendous increase in the death rate during the warm weather, it is safe to assume that at least 75 per cent. is due to other than natural causes, such as illness.

Warm weather is not the only condition which plays havoc with a horse delivery system as, during the winter, the slippery pavements and the cold take a yearly toll of equine life, which, although not as great as that of the summer, is not to be despised.

Truck in the Service of the 22nd N. Y. Regiment; and a Heavily-Loaded Saurer Truck That Did Good Work in Connecticut

Motor Trucks in the Army Manoeuvres

Notwithstanding Adverse Conditions and Total Lack of Organized Testing of Efficiency, the Motor Truck, According to Army Authorities, Has Come to Stay

HEAVY trucks can carry supplies from basis of supply to distributing headquarters; the light trucks can feed the distributing depots in the field; the mules can follow the fighting line. An organized system is the keynote to the army truck question.

A NEW era is dawning in army transportation; quartermasters are beginning to question the efficiency of the mule and horse and are carefully considering the suitability of the motor truck as a means of transportation, both for supplies and equipment, under actual conditions of war. Effective transportation, under such conditions, is the keynote of general efficiency. If the supplies department is rusty, then the whole army will be stultified, for man cannot fight without eating, and to provide the soldier with food is the main problem facing a quartermaster in time of war.

Accordingly, every quartermaster has a regular system of transportation. Every company has 1 wagon, generally drawn by mules. A company consists of 63 men, including officers. There are 4 companies in a battalion, and every battalion has a headquarters' wagon. A regiment consists of 3 battalions, and a regiment has 2 or 3 wagons at headquarters. Still following the system of unification, there are 3 regiments in a brigade, and 3 bridgades in a division. Each division has a basis of supplies. Generally there is a chief quartermaster to a division, and each regiment has its quartermaster.

The Quartermaster's Problem

Thus, the chief quartermaster has laid out before him a clear system of supply. He knows exactly how many men he has to feed; he can calculate exactly how much equipment there is to be carried. Still following the admirable system of unification as far as possible, he assigns one vehicle to each company. That vehicle does satisfactory work; it is enough. At times it has to be overloaded, but it is stated that the long-suffering mules do not seem to care; mules are always willing to do everything to which they are driven. Thus, it would seem at first glance that there is no need for superior means of transportation, as one mule-drawn vehicle is sufficient to do the work of one company. One cannot reduce a vehicle to below one.

But it is efficiency that can be increased. Office systems were considered perfect by their users 100 years ago just as they are now; yet, day by day, time-savers are introduced and organizations modified.

The transportation system of the American army needs modification; such is the opinion of many leading authorities, and the modification lies in the replacement of the army mule by the motor truck *in certain branches of service*. The latter is important, because it is not wise in supporting an innovation to blind oneself to the merits of the existing conditions.

The superiority of service does not lie in the fact that a motor truck is going to take the place of three horse vehicles, but the motor truck is going to overcome the difficulties that lie in the way of the horse or mule-drawn vehicles. The reduction of difficulties is the gateway of efficiency.

The recent army manoeuvres in Connecticut have been an excellent occasion for army men to try out the merits of the motor truck, and from all appearances the motor truck has ably testified to its own admirable character for practical usefulness. But there are exceptions which tend to show that makers and manufacturers must study the special requirements of army service. Certain modifications are necessary in design; there is a great deal of uncertainty as to the proper tire to use in this service; there is a variety of opinion on the most suitable capacity. The makers will have to find out exactly what is wanted; one fact is certain, however, the motor truck is elastic enough to overcome every deficiency.

Here is one big fact: smooth tread tires were often very unsatisfactory—they slipped and slid all over the place and in the sand lanes of Connecticut there were many struggles to get loaded trucks up the hills. Then wheels got stuck in the mud and turned round and round, churning up the earth and getting deeper every minute, although the trucks in many cases were not loaded to full capacity. This is one point for the manufacturer. In consequence, it was found several times that the truck was unable to carry to its full capacity, and such a condition in army work is disastrous. It was not the fault of the motor truck, it was the fault of unsuitability of tires.

Solid tires perhaps did better service than the pneumatics, and most of these were dual on the rear wheels and demountable. Some filler tires were used, and also some block tires, but did not give exceptionally satisfactory service.

It should be understood that most of the trucks used in the manœuvres were not Government trucks built according to army specifications for work in rough districts. They were nearly all trucks loaned by delivery companies, etc., for the occasion, or hired from makers or stores. Many of the trucks used were specially constructed for delivery work in cities; notwithstanding they came out of the trying ordeal well, and Colonel Bellinger, chief quartermaster, said: "I am firmly convinced that the truck has come to stay. In suitable roads it cannot be superseded. It cannot entirely take the place of the army mule, but where the roads justify it, the motor truck is far superior to any other means of transportation for carrying supplies, etc."

The Baggage Problem of An Army

That is another point: the mule may be better for field work, for carrying the equipment of the company, but for fetching supplies from the basis and distributing them to the various regiments scattered throughout the country there can be no better means than the motor truck. Celerity is the principal consideration in such a service.

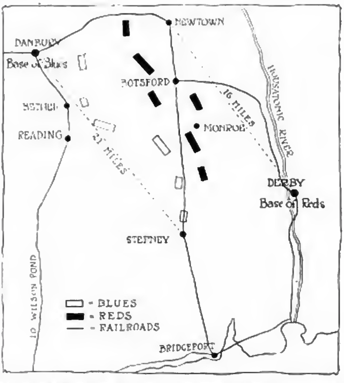
The baggage of any army includes food, tent equipment, men's overcoats, blankets, ammunition, cook ranges, tables, etc. It may be divided into two sections, personal regimental equipment and rations. Mules can carry the former; it follows in the wake of soldiers, who rarely do more than 25 miles a day. There is no necessity for speed, and the truck would often be idle. But supposing a new cooking range were needed. Supposing fresh tent equipment has to be supplied. Supposing an army has been forced to march 100 miles from its base of supplies, with only two days' rations in hand. It is under such circumstances that the motor truck proves its worth. It is an elastic link between the marching army and the stationary basis of supplies.

Thus, it may be stated that the motor truck is for commissary, and the mule for equipment.

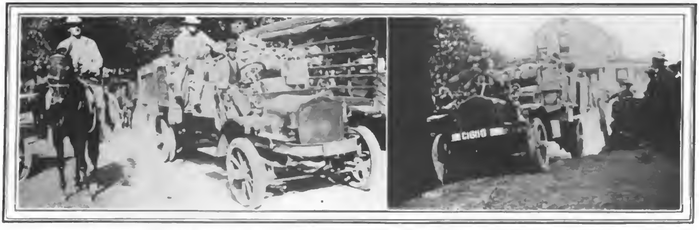
In all there were about 20,000 men taking part in the manœuvres, and these men involved the carriage of a rough estimate of 2000 tons of freight. Each man consumed daily a supply of rations costing approximately about 40 cents.

Each army, Red and Blue, had a basis of supplies. Danbury, shown on the accompanying map, supplied the Blue army and handled 961 tons of rations, supplies, forage and food. Supplies were taken from Danbury to the numerous field depots established in accordance with the march of the army. These latter were necessarily movable. From the field depots to the fighting line rations were carried by the field train. Trucks were employed in both services. Headquarters trucks made on average 48.7 miles per day; field train trucks, 42.3 miles per day. The average daily journey of the mule is from 25 to 30 miles.

For all trucks, gasoline was supplied on contract with garages in various districts. An effort was made to unify the supply of gasoline on both sides, but this was not possible as many of the privately owned trucks made their own contracts with various garages, so that each brigade had different sources of supply. It was generally the custom for each truck on its last trip into headquarters to get in a supply of gasoline that would last during the next day. The average gasoline consumption, Blue army, was 3⅝ miles per gallon.



Sketch Map, Showing the Lines of the Red and Blue Armies and Base of Each Army—Danbury and Derby



White 3½-Ton Truck Used by 14th Regiment (Regulars) Along the Road and Arriving at Camp, Under Mounted Guard

This White Was the Only Truck Which Was Successful in Reaching the Camp of the 14th Regulars at Bethel. The Second Picture Shows a White Truck at Headquarters, Leaving Camp with a Load of Bread and Other Supplies

Truck Leaving Camp with the Rear Guard. This Truck Did Valuable Commissary Work

A fairly full summary of the motor equipment used by the Blue army was gained, but the Red army was more scattered and a definite number could not be obtained. The Blue army had 23 trucks in service, and the number of those with the Red army may be estimated at 30.

Reds and Blues faced each other in parallel lines, the Blues with their backs to New York, which they were protecting from the invading Red forces. The Red army stretched from Derby to Sandy Hook and later on advanced to Newtown, which became a basis point. The Blues stretched from Stepney and Long Hill to Danbury. Newton was occupied at first by the Blues but evacuated later, and occupied by the Reds. The lines extended for from 20 to 25 miles. The average distance between the base of supplies to the distributing depots was 10 miles, and that between the distributing depots and the fighting line 7 miles.

Hauling to the Distributing Depots

From Danbury the hauls to the distributing depots became shorter as the Blue army retreated towards their base. The railroad to Bethel (see plan) was largely used in addition to the 4 trucks in the quartermaster's department. Bethel was the main distributing point, and from here trucks went to left and right and distributed along the Blue line. Almost continual satisfaction was given by these 4 trucks and their average run was 50 miles a day. One or two accidents occurred, but in all cases these were due to mishandling on the part of the drivers. In many cases, too, they were placed in such a position that they were not allowed to benefit from their speed. Three G.M.C. trucks, very much overloaded, were trailing along at the rear of a troop of cavalry, proceeding at a very leisurely pace towards Bethel, and entirely blocking the road. As they were in retreat, the proper place for the trucks would have been in front, where they could have hastened to the distributing center, and having unloaded could have been employed in other work elsewhere. A motor truck must be used in a commonsense manner and should be treated as a never-tiring machine, not as a weary mule.

The four trucks employed in this work made nearly 2000 miles in 8 days.

It is from individual examples that the best idea can be gained of the actual work done by these trucks in the manœuvres.

Work Done By Heavy Trucks

A big Pierce-Arrow came from Buffalo, and full details were kept as to the work done by a quartermaster sergeant and the driver in charge of the machine. In all cases where machines were loaned or let out by makers, drivers accompanied the trucks and acted as instructors to the army men, one of whom always accompanied the truck on its journeys. The details with regard to the 5-ton Pierce-Arrow are not yet forthcoming, but we hope to publish these next month. Extra equipment was carried on this truck, such as a spare rear wheel, a power-driven winch and several heavy planks for the spanning of bridges. The truck encountered many difficulties on its way from Buffalo, but successfully overcame all. The journey took about 4 days. Many of the bridges were unsafe, and the truck had to be unloaded and reloaded several times.

It is a question whether these heavy trucks are suitable for use in war. The answer largely depends on the character of the field of operations. Light trucks of from 1 to 3 tons in capacity seem to be most in favor.

The Massachusetts Brigade, with the Red army, had two trucks in use. Both of these were White trucks and both of 1½ tons capacity. One had pneumatic tires and the other had solid tires, which were being tested and had done pretty good work. These trucks could pass each other in the narrow lanes and were in every way fitted for army work in a rough country district. They had both done a great deal of valuable work by way of carrying supplies and rations. Their speed was excellent, and it was considered that while a big, heavy truck might be doing one journey, with the risk of a breakdown over frail bridges, or a stoppage in narrow lanes, the light trucks could make two journeys. The man in charge stated that the trucks did approximately four times as much work as horse vehicles of similar capacity.

The trucks with the New York militia, on the Red side, did much efficient work. There were 2 1½-ton White trucks, a Mais and a Pierce. The two Whites were owned by the regiment. Each accomplished about 25 miles a day, a greater mileage not being necessary. One truck left Bridgeport camp at 5.30 a.m. and fetched a full load of supplies from New York, a distance of 56 miles. Three hours were occupied by loading. The truck returned at 5 o'clock p.m.

Alco trucks seemed to give excellent service. Two owners supplied Alcos, one of the trucks being used by the Second New York Brigade and the other by the First New Jersey Bridgade; both were of 3½ tons capacity, and they gave every satisfaction to the commissary department in which they were employed. An Alco was also loaned by the Acton Storage Van & Warehouse Co. for use with the Second New York Brigade to carry provisions for the regiment and baggage for the officers. It had to travel across fields and very weak bridges under capacity load, and notwithstanding some most severe tests not once was it reported in trouble during the manœuvres.

There were 2 Saurer trucks used in the New England manœuvres. One of these was employed for handling baggage, camp equipment, tents, etc., and it was constantly overloaded to the extent of 25 per cent. The driver kept a report and he stated that on the first day's run to Bridgeport there were no road difficulties and everything went along quite smoothly until the truck reached Tyler City Camp, where there was a succession of bad roads, broken bridges, sand and heavy rains, but no delays were experienced from breakings-down. The heavy grades were successfully overcome under heavy loads; this was, according to the makers, due to the lightness of the chassis. A light chassis is certainly an essential in such work in such country. Captain Williams, well known as an authority on army transportation, was well pleased with the work of the Saurer trucks. He considered them the best of the rear drive trucks in the test and they were the lightest of the 3-ton trucks.

With the Artillery Brigade of the Blue Army 4 trucks were being used which were stated as not having given satisfactory service. As they were quietly resting in the camp, with nothing to do, it is presumable that the opinion was correct. A motor truck does not look pretty when it is standing still.

Great Utility of Trucks in Signal Dept.

In the signal department at the neutral headquarters a 3-ton White truck was used for conveying apparatus and parts in connection with the aeroplane which did such valuable scouting service. This truck proved extremely useful, and the officer in charge of the signal department said it was absolutely necessary that they should have another truck, of similar design, fitted with a special body designed according to army requirements.

The G.M.C. trucks did good work. One, in the service of the Blue army, delivered a load of 4 tons (carrying capacity in reality 3½ tons) a distance of 21 miles in 3 hours. A 3-ton Alco conveyed the load from this point 4 miles to two commissaries in less than an hour, overcoming a very steep hill.

Bridges were a great source of trouble. Both armies were separated from their bases by streams over which frail bridges scarcely worthy of the name were the sole means of reaching the other side. When a big 5-ton truck is faced by such means of communication one can well imagine the disaster.

Little cross-country work was done, that is to say, the trucks were not employed in the fields, excepting where a camp was situated on an inner field. Generally, too, in such cases supplies were left at the gate of the first field and fetched from thence by the mules.

Touring cars did a great deal of valuable service, and were used largely by aides and messengers and for conveying judges from one scene of operations to another. It might here be mentioned that a touring car specially equipped for army service would be a desideratum.

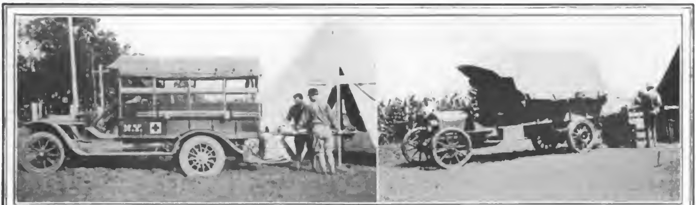
Motor Cycles for Messengers

Motor cycles were largely employed for taking messages between the pickets stationed in the front of each army and from them to the headquarters behind. But their noise precluded them for scout work, and their size was considered to be unwieldy when not in use, as they had then to be carried in the wagons or wheeled by the men.

Bodies of all kinds were to be seen in the field. Huge closed furniture vans, open-stake bodies, closed bodies with exit only at the rear—all were used, and there was really an admirable chance to select the right one. That was the one great advantage of having no special one type in the field; all alike were tested, and an opportunity given to army transportation authorities to select the most suitable.

The truck for ambulance work would be welcomed, only it is necessary to have such a vehicle larger in size than the ordinary horse-drawn ambulance. The latter holds four men inside, having four compartments. The motor ambulances that have been constructed hold the same number. They should be made to hold double the amount, and then their

The 79th and 61st Regiments En Route After Breaking Camp; the Position of Motor Trucks is Shown



Ambulance Truck in the Service of the New York Ambulance Brigade; and Truck Used by the National Guard Delivering Supplies at the General Headquarters

Three of the Largest Motor Trucks, Used by the 71st and 69th Regiments; Unloading Tents and Supplies at the Camp of the 14th Regiment Under Very Hard Conditions

Truck Leaving Camp of the 7th Regiment, Red Army, the Latter Being in Advance

use would be practically assured. Such was the opinion of most of the army surgeons.

The ambulance vehicle should be specially fitted with springs, so as to prevent jolting of the wounded. These vehicles, too, would frequently have to traverse open rough ground, so the tires should be as resilient and as strong as possible; filler tires ought to suit the purpose.

Absolute Necessity for System

A system of delivery by truck is only perfectly efficient when the system is thoroughly mapped out beforehand and organized by a thinking executive. The trucks used in the manœuvres were from all sources, the officers took what was offered them and made no complaint. Some of these were absolutely unsuitable for work in a hilly country, on a sandy soil. But the principal drawback in the recent manœuvres was the lack of system with regard to the combination of truck work with mule work. The trucks were used in quite a haphazard way in most cases, and there was no strict apportionment of labor. Consequently, trucks were often idle, which a truck should never be. The best way in which the trucks could be employed was for conveying supplies and forage from the basis of supply to the distributing centers, and from thence to the armies in the field, the mule should have been used, considering the heterogeneous character of the trucks employed. For work in the fields one must have a truck of a special character. There is no sense in sending a heavy truck down a narrow lane where it can get stuck in the middle. Put the big trucks in the rear, where they can do such useful work in quick delivery of supplies along good roads; put the light trucks in the middle, to traverse the lanes, to convey food and equipment to the various regiments scattered in the field, to assist the ambulance department; put mules in the fields, where they can meet the trucks and convey rations across country to the soldiers under canvas, and attach them to the different regiments for the carriage of equipment. Little service will be rendered by a fast motor truck attached to the tail of a tired body of infantry; it is like putting a fish in a flowerpot to swim.

One criticism has reached us from the captain of the Commissary Department of the Seventh Regiment, National Guard, New York. He says that the large truck furnished for his department was entirely too heavy for the character of the work it had to perform. It was not a question of the power or ability of the machine, but the physical difficulties that had to be overcome. The roads in Connecticut are very bad in places, some very sandy, others boggy. The ground was also very heavy, and it was absolutely impossible for a truck of such size to get away with the work, especially were it overloaded to any degree. However, it went through everything it was possible for a truck of its size to go through. The bridges were very bad and the swampy condition of the land on which the regiment was encamped caused the truck to be mired a number of times. If it had been a smaller truck, say, about 1½ tons in capacity, the captain considered that it would have done the work perfectly and would probably have covered a greater extent of ground than could have been covered by either horses or mules. Mules, however, can go where trucks cannot, and that is a problem which will have to be worked out in the future. The conclusion of this criticism is interesting: "Notwithstanding the difficulties we had to contend with, the truck we had, a Packard, plowed through sandy roads and did very well, so that we concluded that on very heavy, well-built roads, stronger constructed bridges, etc., even these very heavy trucks would have accomplished wonders."

The National Government manœuvres held in Iowa and Wisconsin in June were another fine chance for the display of the qualities of the motor truck. The following actual records kept by the drivers of a Mack 1½ standard truck and a Saurer truck show exactly what a truck can do:

Daily Report of Mack Truck in Wisconsin

June 7, 1912.—Unloaded truck at Dubuque and made two trips from town to camp hauling tents and camp equipment.

June 8, 1912.—Removed top on truck aod shipped same back to Chicago as it was impossible to drive through camp under trees, etc. Preparing to break camp. Hauling extra equipment to freight depot. Unable to measure gasoline as it is siphoned from a barrel. Broke camp and marched to Fairplay about ten miles.

June 9, 1912.—Broke camp—attempted to load truck with 2½ tons, which was very easily arranged, and started behind troops marching east from Dubuque. Roads were very good but hills exceedingly rough and pace so slow that general progress was hard. In camp tonight sleeping in truck, four miles west of Hazel Green, Wis., twelve miles from Dubuque.

June 10, 1912.—Broke camp 4.00 A. M. and hauled over clover field in rain ¼ mile to road. Line of march took us through Hazel Green about 6 miles to the east. Truck running well. Slow going hard on clutch.

June 11, 1912.—Made about 12 miles today, camping near Shullsberg.

June 12, 1912.—Camped North of Darlington. Truck running better.

June 3, 1912.—Camped south of Mineral Point, Wis. Truck ran 18 hours to-day.

June 14, 1912.—In camp north of Dodgeville, Wis. No supplies in camp. Many deserters. Mack goes well.

June 15, 1912.—Camped Spring Green, Wis. Roads getting very sandy with bad holes in river bottoms. Using skid chains all the time.

June 16, 1912.—In camp Spring Green, Wis. Road worst we have had. Mack does well, hauling about 2200 lbs. of equipment.

June 17, 1912.—Spring Green, Wis. Have made no repairs so far. The truck has covered about 12 miles on road per day and has hauled 20 supplies.

June 18, 1912.—Reached Arena, Wis., and received no supplies. Roads very bad.

June 19, 1912.—Camped at Middletown, Wis. Roads better. Received supplies from Madison by the Saurer truck, ½ gal. oil lubricator, 1 pt. oil in clutch.

June 20, 1912.—Made trip to Madison and return, 18 miles; 15 gals. gasoline, ½ gal. oil.

June 21, 1912.—Left Middletown 7:00 A. M. Arrived camp at Madison 10 A. M. Made 7 trips to city of Madison hauling provisions. 2½ gals. gasoline, 3½ qts. oil, 30 miles.

June 22, 1912.—Five trips to Madison, 1 back to Middletown. 5½ gals. gasoline, 2 qts. oil. Car runs well; 28 miles.

June 23, 1912.—Made two trips to Madison for mail. 4 gals. gasoline, ½ gal. oil.

June 24, 1912.—Drove from Madison to Ashton and back to Middletown, hauling supplies to New Camp at Ashton. 6 gals. gasoline, 2½ qts. oil.

June 25, 1912.—Broke camp to-day at Ashton, and marched to Sauk City. 2 trips to Sauk City from camp, 26 miles. 5½ gals. gasoline, 3½ qts. oil.

June 26, 1912.—Drove into Prairie du Sac. Only made 10 miles to-day. 5 gals. gasoline, 1½ qts. oil. Cleaned carbureter.

June 27, 1912.—Left Prairie du Sac. Drove to Baraboo. Car running well. Transmission oil, 2 gals.; gasoline, 7 gals.; oil, 1½ qts.

June 28, 1912.—Left Baraboo 9:00 A. M. for Abelman. Driving back again for supplies made good time. 28 miles. 7 gals. gasoline, no oil.

June 29, 1912.—Broke camp at Abelman. Marched to Reedsburg. Sandy roads. 28.4 miles. 4 gals. gasoline, no oil.

June 30, 1912.—Dismissed and drove to Madison on way home, 58 miles. Mileage, 6,754.1.

Daily Report of Saurer Truck in Wisconsin

June 7, 1912.—Unloaded truck at Dubuque and did transfer hauling between camp and town, 2 miles.

June 8, 1912.—Took company ball team to East Dubuque to play ball.

June 9, 1912.—Picked up load of potatoes, onions and canned goods—6,074 lbs.—in morning and left Dubuque with blank truck at 1 P. M. for camp near Hazel Green, Wis. We were obliged owing to the position of the enemy to make a detour around Sinsinina Mound. Roads and hills very rough and bridges weak. Orders were not to separate trucks unless abandoned, consequently Saurer was continually waiting for other trucks. The Saurer was so much lighter that it crossed all bridges and soft spots with no difficulty and towed several heavy loads many times. The upper crust of the road was about two inches thick and covered with an inch of dust. Another truck being used carried the same load and was a three-ton truck, but was so much heavier than the Saurer that it frequently buried itself to the axles. This proved conclusively that three tons was the maximum net load that could be handled in that country. Reached Hazel Green 9:00 P. M., after using block and tackle to get another truck out of a hole that Saurer made on second speed. Slept in truck in main street of town.

June 10, 1912.—Returned to Dubuque, running over clover field in rain and picking up tents and blankets left at old camp. Arrived Dubuque 1:00 P. M. Made two transfer trips in afternoon.

June 11, 1912.—Transfer hauling between old camp where bakers were located and city of Dubuque.

June 12, 1912.—Transfer hauling between old camp where bakers were located and city of Dubuque.

June 13, 1912.—Left Dubuque with 6,000 commissaries in company with two other trucks. Saurer pulled each of these trucks out of three holes which the Saurer negotiated without help. This fact was due to excessive chassis weight in other makes. These two trucks were abandoned at Hazel Green where we spent the night.

June 14, 1912.—Mileage 6,808.4. Saurer and one other truck proceeded to Mineral Point. Arrived 9:30 P. M. Used 150 feet of rope and 50 feet of chain to get traction. 46.1 miles.

June 15, 1912.—Left Mineral Point for camp at Spring Green 12:30 P. M. and arrived Spring Green 5:30 P. M.

June 16, 1912.—Mileage 6,833.8. Transfer work at camp. Very sandy roads.

June 17, 1912.—Left Spring Green, Wis., 6:00 A. M. About 4 miles out struck sand for 6 miles. Made one-quarter mile from 11:00 A. M. to 7:30 P. M. Arrived Arena, Wis., 1:30 A. M.

June 18, 1912.—Mileage 6,875.3. Left Arena—arrived Madison 11:00 A. M.

June 19, 1912.—Made one trip to camp at Middletown. Fine macadam roads.

June 20-24, 1912.—Inc. Mileage 6,943.8. Transfer from Madison to camp at Fair Grounds.

June 25, 1912.—Mileage 6,943.8. Made trip to Sauk City and return with 2 tons supplies.

June 26, 1912.—Transfer work in Madison.

June 27, 1912.—Made load to Baraboo, Wis., returning to Sauk City before night.

June 28, 1912.—Mileage 7,031.7. Returned to Madison. Transfer work in Madison.

June 30, 1912.—Sunday Transfer work in Madison. Dismissed and started for demonstration at Cuba City.

The Solution of the Army Heavy Freight Problem

The army allows $5 a day for the upkeep of a man and a pair of mules. Each wagon pulled by the pair of mules is capable of carrying about 3000 pounds, and each wagon makes about 25 miles a day. A truck can go 4 times that amount and can carry 4 times the amount of freight in the same time. The latter needs gasoline and tires and a careful driver; the mule wants a companion, fodder, sleep and the care of a veterinary surgeon.

One of the great points about the motor truck is that it cannot get tired. Pull it over the worst hills in the world, push it through deep ravines, plunge it into thundering cataracts, and although it may take time and patience to extricate it from the difficulties of soft mud, dry sand and running water, nevertheless, once out, it is as fresh as when it started and ready for a 100-mile run along a fine road or another fight with a sticky soil. Mules have nerves and limbs that tire; a motor truck has only brains, carrying capacity, power and speed, and all are always at par.

The average life of a mule is from 6 to 8 years, and he can frequently work for 24 hours at a stretch. But after that he needs rest.

The motor truck is the solution of the heavy freight transportation problem; the army mule, however, is a unit which may be usefully employed in the field and should not be altogether discarded.

The Red Army Automobile and Truck Train at Derby Where the Headquarters of the Red Army Were Situated

Quartermaster's Truck Used by the Aviation School at Paradise Green; and Truck in 71st Regiment Camp

Mileage Service Received from Solid Tires

Something Wrong with American Conditions — Representative Truck Dealers and Manufacturers Give Their Opinions on a Serious Question—Specific Examples of Solid Rubber Tire Mileage Service on Average Streets—Part II

LAST month leading solid tire manufacturers gave their opinions on mileage guarantees and stated the basis on which they respectively established such guarantees, likewise giving suggestions as to how tire life could be lengthened and truck mileage improved. This month we publish the opinions of the leading truck dealers and manufacturers on the same subject, with special reference to examples of truck mileage obtained. The following was sent to all dealers:

MANY truck owners are not satisfied with the mileage they get on solid rubber tires. In Europe trucks average 30,000 to 40,000 miles on one set of tires. In America the tire makers guarantee 8,000 to 10,000 miles. It thus costs more for tires in America than it should. This is due to poor pavements, to overloading and overspeeding. Can you give several examples of tire mileage giving truck capacity, tire mileage service and average street conditions?

37 replies received from truck dealers.
9 are getting satisfactory mileage.
11 give overloading as the cause.
6 blame the driver.
5 think it is due to overspeeding.
12 say that poor pavements are the cause.
4 think that American tires are poorly made.

THE question of commercial vehicle tire mileage is a very serious one at the present time in America. Every purchaser of a motor truck, especially if he is a pleasure car owner or has read much on the subject, lays particular stress on this point. One of the first things he wants to know is how many miles he is going to get from a solid or pneumatic tire, as the case may be. Dealers and manufacturers of trucks are in most instances able to quote figures on mileage obtained by users of their trucks, but it is very hard to predict what results a customer is going to obtain as everything depends on the conditions under which the truck is to be used.

Analysis of the Replies Received

In order to get the opinions of representative truck dealers and manufacturers on the subject the COMMERCIAL VEHICLE wrote to them asking the question given at the head of this article. The total number of replies received to date is thirty-seven and out of this number only nine state that they are getting satisfactory mileage! Truly something is fundamentally wrong with American conditions when so few are securing this service. The opinions, which are given in full below, differ widely as to where the fault lies; some men place the blame on the owner of the truck and its driver, others think it is due to the poor paving of the cities and the remainder either blame the tire manufacturer or do not express any opinion. Overloading is given as the cause or one of the causes by eleven, while six state the lack of greater mileage is due to the poor usage that a truck gets at the hands of the average driver, and five consider that overspeeding is at the bottom of the difficulty. The drivers, however, do not always intentionally misuse their truck tires, as some of them sincerely believe that they are saving wear and tear on their vehicles by driving in the street car tracks, which practice, on the contrary, is hard on tires. According to twelve the poor pavements are at fault, and four place the blame with the American tire manufacturer.

BOSTON, MASS.—It is characteristic of the American race to always want more, and if they were getting 30,000 to 40,000 they would then want 50,000 to 60,000 miles, and the American tire makers are only playing safe when they guarantee 8,000 and 10,000 miles.—H. B. Pruden, Kisselkar Co.—Kissel-Kar.

NEW YORK CITY.—We recommend Goodrich tires for all our trucks, as thorough investigation has proved that on our trucks at least they cost less per mile than any other tire obtainable in America. We do not know how long the front tires on our trucks will last. They show very little wear at the end of 10,000 miles, which seems to be the average life of the rear tires on our trucks, although they are guaranteed for 8,000 miles.—Robert C. Reid, Harrolds Motor Car Co.—Pierce Arrow.

Why Should User Pay Extra Amount for Equipment?

PITTSBURGH, PA.—If a tire manufacturer specifies a 4-inch dual equipment to carry a 3-ton load and guarantees it for 10,000 miles, why should the user pay the extra amount for 5-inch equipment when he can get no greater guarantee? In this district, which is particularly trying, very few tires on the rear will run over 4,000 miles on heavy service machines.—H. Howard, Packard Motor Car Co. of Pittsburgh.—Packard.

CAMBRIDGE, MASS.—Would say there are many sides to this question. I know they get remarkable mileage on tires in Europe; this is because the tires are made to wear and not to sell and because the size is ample to carry the load and it is my opinion that the foreign trucks are sprung much better than the American trucks which naturally helps the tires. Of course, the road conditions have a lot to do with it. The motor truck and tire situation to-day is in a very bad condition. Everybody seems to be doing everything that is consistent to make a sale. To illustrate: Any number of people selling a 3-ton truck put it up to the man that it is good for 4 and even 5 tons and in the majority of cases make no mention about larger tires; the result on both truck and tires we all know. Then the average buyer always wants something for nothing, but he generally doesn't get it, although he thinks he does when he buys a 3-ton truck which the agent tells him is good for 4 tons. Right here I might say that many agents representing what are considered the leading trucks invariably state their truck is good for an overload of 30 per cent. and upwards.—A. H. Harrington, Dodge Motor Vehicle Co.—Commer and Pope Hartford.

Great Variety in Life of Tire

Boston, Mass.—It has been the writer's experience that the life of tires varies so much that it is almost impossible to quote. Of course, as you say, "hard tires are guaranteed from 8,000 to 10,000 miles"; we find that the life of the tires depends wholly on the conditions of the roads, the loads that are carried and the way the driver operates his car. As these vary in nearly every case it is impossible to make much of a statement in answer to your question.—Robert G. Howard, Bessemer Motor Truck Co.—Bessemer.

St. Louis, Mo.—The average owner has to learn from experience, and the usual tire equipment is too near the truck capacity to allow for the "overload capacity" which salesmen are forced to argue by competition. We have heard a competing salesman argue that he "would not have a truck he could not overload," yet his truck was tired for capacity alone. The driver should be watched by the owner, as it is evident that a larger load can be carried on the same tires with care than a smaller load could be jolted along. Also drivers ignore car tracks and ruts. The bonus system could be used here to good effect.—S. S. Aull, Benoist & Aull.—Commer.

Cincinnati, O.—We wish to state that the conditions of our streets and neighboring territory and roads in adjacent territory are so severe that we have not received even favorable mileage out of the various tires which have been used. We are also convinced that the overspeeding and overloading on the different commercial vehicles in our city has had a great deal to do with the low tire mileage.—M. A. Enders, Ford Motor Co.—Ford.

Cleveland, O.—Our tire mileage varies from 1,500 miles to 7,000. We find that all sizes of cars are practically uniform in tire wear. Street conditions in Cleveland are exceedingly unfavorable for long tire mileage and we probably do not get the mileage that is obtained in New York and some other cities. We have complete records of all our cars and can give you a great many examples of tire mileage, but most of our tire trouble has been caused not by wear but by the loosening of the fabric from the base; therefore our figures would have little value to you.—W. C. Molin, Grabowsky Power Wagon Co.—Grabowsky.

Short Life Principally Due to Overloading

Philadelphia, Pa.—The question of mileage for trucks is a serious one and in the subscriber's belief the reason the tires are not giving longer life is due principally to overloading, with, quite possibly, an unequal distribution of the load as a contributing cause. The load should be distributed so that not more than 70 per cent. falls on the rear axle. Running in car tracks with small trucks will undoubtedly cause considerable loss of mileage to the tires. The big trucks, owing to the wider tread, are not guilty of this habit, but at the same time their speed being limited would hardly cause any great depreciation of the tires from overspeeding.

It is quite possible that some of the truck manufacturers heretofore have not equipped their chassis with sufficient tires at the start, but this is being taken care of in recent months. I know of one 5-ton truck the tires of which only lasted 500 miles; that is to say, in 2,000 miles they had four new sets of tires. I know of another instance where a 5-ton truck ran 10,000 miles and the tires, while worn, were in good condition and were capable of further use.—Fred G. Browning, Continental Motor Car Co.—Speedwell.

Chicago, Ill.—Will say that the solid tires manufactured in America nowadays are anything but satisfactory. We cite one instance where we had a hard rubber base tire separate from the rim after 458 miles of service with very light loads, part of the time not any, on good streets here in the city. This is a case of a 34 x 3½ tire on the front of a 1½-ton truck which weighed about 3,800 pounds.—R. S. Mattoon, R. S. Mattoon Motor Co.—Indiana.

Cleveland, O.—We find tire mileage to vary from approximately 8,000 to 12,000 miles, with the special electric compound we are using in our solid tires. While it would be possible to obtain considerably higher mileage on our electric vehicles, owing to the comparatively slow speed in comparison with gas trucks, we find tires which will give a higher mileage are not sufficiently resilient to give the most economic service from the point of current draft. In other words, we aim to get the compound of our tires such as to give a happy medium between current draft and life.

The variation between 8,000 and 12,000 miles is probably due to the loads, street conditions, manner in which the trucks are driven and similar variable factors. A tire which would give 20,000, for example, would, judging from our previous experience, be so inefficient from the point of electrical consumption as to be impractical for use on electric trucks.—E. J. Bartell, Baker Motor Vehicle Co.—Baker.

Milwaukee, Wis.—We have sold the Pabst Brewing Co., this city, one of the Pierce-Arrow 5-ton trucks which has now run in the neighborhood of 7,000 miles and has been used for country delivering. We think these tires have stood up very well considering the road conditions and we believe they are good for about 5,000 more miles. We have also sold W. H. Pipkorn Co., this city, one of these trucks which is given very hard usage and the tires are standing up very well.—A. E. Raffant, American Automobile Co.—Pierce-Arrow.

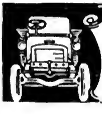
Tire Mileage Runs Below Manufacturer's Guarantee

Pittsburgh, Pa.—The tire mileage of trucks in this locality, so far as our experience is concerned, invariably runs below the guarantee given by the manufacturer, but thus far we have found that the adjustments made by the manufacturers under their guarantee have been perfectly satisfactory to our customers and therefore the tire cost can be reduced to absolute figures.—Julian B. Howe, Pittsburgh Auto Co.—Commercial.

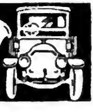
Chicago, Ill.—We are hardly in a position, since we have only produced trucks since January, to state anything in reference to the tire mileage; however, in this city we believe there will be many difficulties from overloading and especially on account of the poor pavements. We believe in large tires for our trucks and are very liberal, more so than any other competing concern, in tire equipment. We allow a 25 per cent. overload in Velie trucks; we have ample power not only in the motor but in the brakes to care for this allowance in overload and also in our general construction. It is impossible to drive our truck greater than a given speed, which is approximately 12 miles an hour, on account of our gear ratio and governor on the motor.—M. H. Luce, Velie Motor Vehicle Co.—Velie.

Chicago, Ill.—While we appreciate that the tire problem is causing users, as well as manufacturers, a great deal of concern, it is a question which does not trouble us greatly, as the Mercury is a 1,000-pound capacity car and our tire equipment is such that we are able to give our customers a positive and unqualified guaranteed tire cost of not to exceed 1 cent per mile, and many of our owners are operating their cars at .06 to ¾ of a cent per mile.—W. A. Zimmerman, Mercury Manufacturing Co.—Mercury.

Owing to pressure on space, we are unable to publish this month the remainder of the replies that we have received from truck dealers and manufacturers; these, however, containing much valuable data and many personal expressions of opinion, will appear next month.



The Editor's Viewpoint



THE INTERNAL SYSTEM OF HANDLING GOODS

THE merchant who simply replaces a horse team or two horse teams with a motor vehicle without revamping his delivery system and his system of internal handling of commodities is reaping but a small percentage of the increased value which it is possible to secure from motor trucks as compared with horse transportation.

Recently a large downtown grocer, in an Eastern city, installed a 1-ton motor and merely took off one horse vehicle and put the motor in its place. The motor made little more distance per day than the horse vehicle and spent much longer time waiting to get loaded at the store. The grocer realized the greater expense of maintaining a motor than a horse vehicle for the same amount of work done, but was content in that the motor proved a big advertisement to his business, particularly with customers living in exclusive sections of the city and he also gained trade by making earlier deliveries than were possible with horses.

This merchant, and his case is the case of hundreds of others, has not entered into the economic sphere of the motor vehicle as a substitute for horse transportation. The merchant who merely considers the motor truck as a horse substitute has failed to grasp the intended field of the motor, he has not entered into the spirit of the latest means of transportation.

To make the motor truck a success means to reform the entire delivery system of a business house, such as grocery, laundry, department store and hosts of similar businesses. The merchant must first of all realize that the motor truck must be kept moving—idleness is its greatest enemy. The horse required a rest after each delivery and consequently if he had to wait over an hour and in some cases two hours while the load was being put on that was not any loss to the company, because the horse needed the rest.

With the motor vehicle it is not so. The motor does not need the rest, it is designed to work 10 or 24 hours per day if necessary at 75 per cent. of its efficiency and enjoy a long life of 10 years or more. If it works at a higher efficiency its life will not be so long. To keep the motor truck idle for an hour or 2 hours when loading is a needless loss. It reduces the truck's efficiency and also reduces the field of expansion for the company. The internal delivery of parcels from the retail clerk in the store to the shipping clerk must be reformed so that not a second is lost; and the system of operating in the shipping department must also be revamped so that when the truck arrives from one delivery it is but a few minutes before it is loaded and off on another delivery.

This means reform in the shipping systems within the store or building. It means a discontinuance of the horse-pace methods now in use. The shipping executive and his aids have been for years accustomed to horse-pace methods; the horses had to be rested and they formulated their programs to give them the required respite. To-day many of these shipping executives are continuing their same horse-pace methods with the motor truck; the truck is kept waiting. It is an impossible situation; it is a situation that demands immediate reform; it is a situation that calls for quickened pace, a pace that must keep step in step with the motor and not a pace set step in step with the horse.

Many a store or other business house proprietor fails to inspect and see if his shipping clerks and other transportation executives are operating their motors at horse pace. If they are there is only one answer and that is loss. It is impossible for such a régime to continue and the affairs of the company develop as the development of the times would permit.

Not a few shipping executives object to motor vehicles because of the extra duties they impose on them. The driver of the horse delivery wagon who has been accustomed to making fifty deliveries per day finds himself capable of making 100 or even more in the same length of time. This means much additional physical exertion; it means the same to the jumper boys on the wagon. The shipping or transportation executive must take recognition of this. If the added physical labors are too great then a two-man system must be instituted and the extra expense of the additional man is small when compared with the increased radius of business possible with the faster speed of the truck. It may mean that two jumper boys per wagon are needed where one sufficed with the horse equipment. If so then it must be done. It would be a short-sighted policy to keep the truck from performing its maximum of service solely because of the extra salary of a jumper boy.

But the reforming of the internal shipping system of the store must go further to bring the motor truck into its own. The entire system of packing and handling between the retail clerk and the shipping platform may have to be changed. With the motor more deliveries per day can be made, this calling for a new closing hour of sales to make certain deliveries. This necessitates, as scores of merchants are now doing, an advertising campaign announcing to buyers the increased delivery system, the cutting of the time in half between the purchase and the delivery at the home. This may mean added forces within the store between the retail clerk and the shipping room. It may call for improved means of transporting the merchandise from the retail clerk to the shipping room. It may call for more help in the shipping department, etc. The ramifications of reform permeate the entire store.

To-day not a few merchants are bothering themselves as to how they can take care of the motor when they purchase it. All of their worries are focused on the mechanics of the truck; all of their conversations are centered on mechanical points, whereas with them the big problem is the reforming of their internal systems. The mechanics of the truck is immeasurably in advance of the internal handling systems of business houses. What is needed is efficiency experts in the internal systems, rather than mechanical experts. There are hosts of trucks today that will give good satisfaction if given a moiety of care by the drivers, and where these trucks develop weaknesses there is not any person more interested in correcting these troubles than the truck maker, because on the performance of his machines and on the treatment he gives his customers depends the future of his business. Let the merchants take up the real problem of the truck, namely, reforming the old horse-pace methods of the internal systems and putting every department of the shipping or delivery field in step with the pace of the motor truck.

MOTOR TRUCKS FOR THE ARMY

THE recent military maneuvers in New England formed a splendid chance to improve the position of the motor truck in the eyes of military authorities, but the use of the motor vehicle was carried on in a hopelessly disorganized manner and very few of the motor vehicles were in any wise adapted to the work.

In these maneuvers the motor seemed to be an afterthought adopted at the eleventh hour to solve an almost impossible question. Baggage, commissary and a score of other commodities had to be transported. Mules could not possibly accomplish the work in the allotted time. There was a general call to arms of motors. Couriers went out and hired whatever types of vehicles could be secured at $25 per day and up. An onslaught was made on baggage moving vans, due to their inactivity, being in the mid-season of the moving year. Some of these trucks were 5-ton vehicles that could rarely be loaded in excess of 3 tons because of weak bridges. So the story might be continued, of securing motors not properly adapted to the work. Some of the vehicles had gear ratios for level streets and naturally could not work to advantage in hilly country sections over rough roads.

The remarkably few army-owned motor wagons, that were adapted to the work, showed the great superiority of motor power over mule power for field work; even the ill-adapted heavy trucks demonstrated the same fact. The many touring cars in the service of army officers demonstrated the invaluable services of the motor, all of these vehicles averaging over 90 miles per day and some far exceeding these figures. In the day of the horse the capacity of the officer was limited to the radius of action of the horse; to-day with the motor his boundaries have been extended two-fold, in many cases four and six-fold and the possibilities of his activities have increased in other ways more than ten-fold.

It is to be hoped that at the next annual maneuvers the motor phase of the movement will be taken up in advance and a properly organized department created. As it was this year there were not any properly established depots for motor supplies, etc. The touring cars secured gasoline wherever they could. Each make of truck had its own supply schemes. What it needed, and what the motor makers should insist on is a properly organized corps of motors. The vehicles should be suited to the work and they must also be suited to the physical conditions of the country in which the operations take place. Proper gasoline supply depots must be incorporated as a part of the scheme; proper garaging systems must be incorporated in the scheme; and, in a word, the motor system of transportation must be as carefully organized and conducted as the other army systems.

CHOOSING THE MEANS OF TRANSPORTATION

EVERY business has a transportation problem of its own to which the general principles of transportation may be applied. These principles are sufficiently elastic to allow for a wide margin of special conditions, and it is only by moulding general principles with special principles that the transportation problem of any one business can be solved.

A business man, in the true sense of the term, does not jump to conclusions and settle important points without thorough circumspection. The transportation problem to him does not mean merely the sending of goods from factory to wholesalers, or from wholesaler to retailer, or from retailer to customer; the question is not only a question of carriage. To the business man the question involves cost; every item incident to transportation must be brought down to its lowest figure consistent with its greatest efficiency. The one point he always remembers is that paying out money does not necessarily mean bringing in service. He asks himself when considering each point the following questions: 1. What is the best service for my special product? 2. What will best suit the requirements of the factory? 3. What will best suit the requirements of the customer? 4. What service will give me speed combined with the minimum risk of accident to both vehicle and goods alike? 5. What service will serve as the best standing advertisement of my business? 6. What service will be the one and only service for my special problem, so that once adopted there will be no necessity to change it?

These are the questions which every business man should ask himself when considering the transportation problem, and he will find the answers only by an actual examination of facts, and from the results of previous years, and the experiences of others in the same way of trade.

Take for example, one question: What will best suit the requirements of the factory? The factory may be almost adjacent to the market. The product may be such that quick transit from factory to market may be essential. It may be possible to utilize with advantage a conveniently situated railroad, thus doing away with the additional cost of a separate means of delivery. Retail delivery wagons may be so constructed as to admit the conveyance of raw material to factory, manufactured article from factory to market, and retailed article from market to customer, if the same business controls the same operations. An important point should be remembered when considering house-to-house delivery. In retail delivery much attention should be given to appearance and style; good form impresses a customer more than anything else, even the quality of the article sold. Wrap an orange in bright silver paper and tie round it an artistic piece of pink ribbon, and you can sell it for double the price obtained for it in the street off a barrow. Send along a sack of coals in an up-to-date motor truck, and the buyer will be convinced that he is getting more worth for his money than if the sack was wheeled along in a trolley by a single man. One of the great maxims of salesmanship is to put your article in an attractive wrapping; the wrapping is the conveyor of the first impression, and nine people out of ten judge by the first impression. And as the wrapper is the outside of the article so is the means of delivery the outside of the wrapper, and will be even before the latter in the creation of a favorable or unfavorable impression. This point, however, does not perhaps come within those points necessary for specific consideration when choosing the best means of delivery from factory to market. What is specially wanted there is utmost utility at lowest cost.

Which Is the Better Method of Truc

Left-Side Control Seems to Be More When Controlling a Truck in Hea Also Has Its Merits and Is t

THE opinions of many leading manufacturers and d which are printed below, and from the opinions erned purely by personal experience; custom in driving: Both methods have their conspicuous advantages and th photographs taken of m

THE question of right or left-side control is a question that is to a great extent answered merely from a personal point of view; that is to say, if one has been in the habit of using right-side control, then all arguments seem in favor of that control, simply because continual use brings complete familiarity with an adopted habit or custom. Nevertheless, there are certain facts about left and right-side control which must be accepted by everyone, and in order to pass a final judgment as to the method best suited to the requirements of the driver and the road, these facts must be placed side by side and weighed according to their respective importance.

The question is undoubtedly an important one, because there is much strong feeling on the subject. THE COMMERCIAL VEHICLE sent a letter to American truck makers, in which the latter were asked to express their views on the subject, bringing out the advantages of either method, especially with regard to the following points:

1. When turning to the right of a crowded street.
2. When turning to the left.
3. When meeting a vehicle traveling in the opposite direction.
4. When overtaking a vehicle traveling in the same direction.
5. When the driver's seat is located sufficiently high to have a clear view to the rear over the top of the load or body.
6. When the body is a van or other inclosed type, when a view to the rear is difficult to obtain.

Right-Side Standard, Left-Side an Innovation

The replies received, reproduced below, form a very interesting analysis of the whole question, bringing out many points in favor of each method of control. These opinions of the makers are supplemented by the personal opinions of actual drivers who perhaps are really the best people to form a judgment in this case.

The right-side control may be considered as the standard control at present, the left-side control being in the nature of an innovation. Consequently it may be assumed that most actual users would be in favor of the right-side control, having acquired dexterity in manipulating a truck with control levers and steering wheel on the right.

But, generally speaking, we find that the makers are more or less in favor of the left-side control according to the letters we have up to the present received. Some are indefinite on the subject regarding the matter as entirely ruled by custom and personal prejudice. Others think there is little advantage of one side over the other, but that a most decided advantage would be forthcoming by using the center control when the driver can get out of his truck on either side according to necessity.

ADVANTAGES OF LEFT-SIDE CONTROL

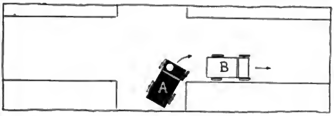


Fig. 1—When turning to the right the truck is near the curb and the look-out has to be kept in front, and as far as possible down the road on which the truck is entering. If the driver is sitting on the left, as in A, he has a far better view of B and of any truck or vehicle which may be behind B or coming up on the right.

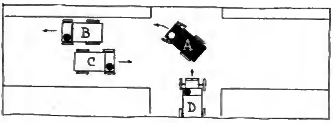


Fig. 2—When turning to the left, crossing the street, the driver on A, sitting on the left side, has a better view of traffic which he is crossing, such as D, of traffic coming towards him, as C, and of traffic in front of him which he has to clear, such as B.

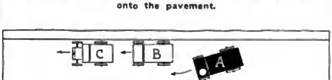


Fig. 3—The driver, when alighting from the truck to unload from the back and deliver at the houses, if his seat is on the right side, as in B, will have to walk right around his truck in the course of the dotted line. If, however, he is on the left side, as in A, he can get right off onto the pavement.

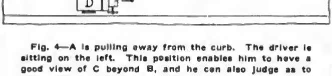


Fig. 4—A is pulling away from the curb. The driver is sitting on the left. This position enables him to have a good view of C beyond B, and he can also judge as to the position of D standing by the opposite curb. If the driver were sitting on the right, B, if a big van, would intercept the view.

ontrol—Left-Side or Right-Side?

vor Owing to the Many Advantages affic—Right-Side Control, However, re Natural Arrangement

been gathered on this interesting topic; from their replies, al drivers, it would appear that the question is one gov- kind of control begets a decision in favor of that control. depicted in the accompanying diagrams and in a series of ks in actual operation.

Although, as stated, personal custom and usage largely govern the solution to this problem, nevertheless, the aim of the truck maker at present is to standardize. To standardize one must always find the best methods of doing things. The best method is the sum of "arguments for." In the accompanying diagrams are presented the arguments in favor of left-side control and those in favor of right-side control. Some of these will appear to be contradictory, but this is not so; in such cases there is a definite value in having left-side control and likewise in having right-side control; the respective diagrams show in each case where that advantage lies.

The opinions we have received from various makers are as follows:

Driver on Left Has Every Advantage

Philadelphia, Pa.—I have for several years been handling electric trucks, also the Mais gasoline trucks, all of which have left-side control, and I firmly believe that the driver seated on the left side has every advantage and better control of his machine, having always an unobstructed view of vehicles coming toward him and being in a position to judge the distance in passing to better advantage.

I have talked with a number of horse drivers who are now driving left-side controlled trucks, and they all tell me that they are very much better satisfied seated on the left side of the vehicle. In a number of the new models of rucks, Mais gasoline and others, they are placing the steerng wheel on the left side and the levers in the center of he car, allowing the shifting of gears to be made by the ight hand. We have a number of left-side driven trucks n Philadelphia and the drivers tell me that by being seated n the left they can more readily see the faster moving leasure cars as they come up from the rear and can clear hem to better advantage, as practically all moving vehicles ass on the left side. I am a strong advocate of left-side teering.—Woods Electric Garage—W. H. Metcalf.

New York, N. Y.—Relative to the left-side control for otor trucks, we would say that we have adopted the same s a standard equipment on the Knickerbocker. After oking over the ground carefully and driving the trucks hrough congested districts with both right and leftide controls, we found that the car can be driven with uch greater ease with the driver on the left side, owing the fact that a truck when turning to the right is necesrily near the curb and you don't have to look behind to e whether you will have a collision or not and when turng to the left the driver is on the left side and can see who coming without slowing down by simply looking behind, e view not being obstructed by the big truck body, which the case if the driver is on the right side. It also facilitates

ADVANTAGES OF RIGHT-SIDE CONTROL

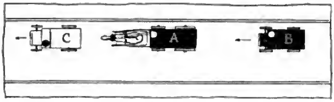


Fig. A—Practically every horsedriver who is learning to drive a truck has been used to driving from the left. Consequently when A becomes the truck driver B, he will find that position much easier than if he were transferred to the truck C, where the control is on the left.

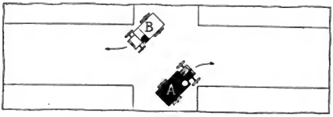


Fig. B—If a truck wishes to turn a corner to the right, it is the duty of the driver to keep to the right-hand curb. Provided he does this, he will be safe from collisions. B, with his control on the left, may, however, be taking too wide or too narrow a sweep, and may possibly collide with traffic on his left or with the curb.

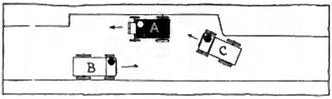


Fig. C—In all cases, it is the duty of a driver to keep his truck against the right-side curb, following the indentations, if any, that are in the street, as A does. If the driver is on the right side of his truck then he is far better able to keep close to the curb.

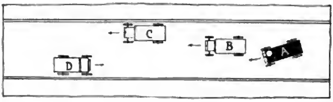


Fig. D—The driver of the truck A wishes to pass B, moving slowly, and C, standing motionless. He is on the right side of his truck, and from that position can exactly estimate how much clearance there is between his own truck and B, and between the trucks C and D. Hugging B and C he is safe from any oncoming traffic such as D.

ADVANTAGES OF LEFT-SIDE CONTROL

(Continued)

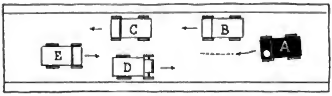


Fig. 5—The truck A wishes to pass B, going in the same direction. It has to pass on the left side of B. The driver, sitting on the left, has a clear view of oncoming traffic, D and E, and also of C, going in the same direction, or standing still.

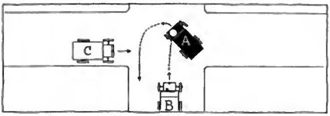


Fig. 6—When the driver of A wishes to turn around and go in the direction from which he came, if he is sitting on the left, as in A, then he is in a good position to see B, coming towards him, his vision following the dotted line. He also has a good view of any traffic coming from the Left, crossing the road, as C.

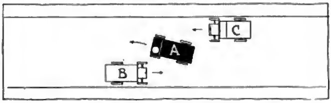


Fig. 7—The driver of A in passing between B and C, in a congested thoroughfare, can judge to a nicety how much clearance there is between the two.

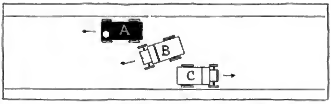


Fig. 8—As vehicles have to pass each other on the left side when going in the same direction, A with his seat on the left side has only to turn around to obtain a clear view of any traffic that is overtaking him, such as B, or of traffic that may be standing on the opposite curb, as C, that may possibly be turning around to come towards him.

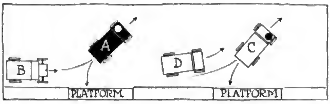


Fig. 9—A and C want to back their trucks against two loading platforms. This operation needs a good deal of manipulation, during which the street may be partially blocked. A, however, by turning his head, can see whether he is intercepting oncoming traffic, such as B. On the other hand, C may unintentionally back into D, as he will not be able to see the latter.

getting on and off the truck when the driver stops alongside the curb and one can get on and off the truck without walking around the front of it, which saves a lot of time during the day.—Knickerbocker Motor Truck Mfg. Co.—F. F. Lewis, general manager.

San Francisco, Cal.—The writer's opinion would be to have right-side control on all trucks so long as they are driven in a crowded street. Left-side control is all right in the country.

Almost everybody who learns to drive a truck has been driving wagons and every wagon driver always sits on the right side. If he drives an automobile he is much surer on the right side than he would be on the left side. He could figure much better on the right side than he could on the left because he has been practising it for almost his lifetime. It is against the law to drive on the left side. Why should the driver's seat be on the left side? The writer can see no reason why a change should be made so long as the right side is satisfactory.—Kleiber & Co.—Paul Kleiber.

Philadelphia, Pa.—We are decidedly in favor of the steering wheel being located on the left side of the truck. Ordinarily in turning corners, passing other vehicles, etc., we do not believe that the question of whether the driver is on the right or left side makes very much difference, for the reason that after the driver has handled a particular truck for a short period he becomes so expert in handling it, in gaging distances, etc., that he finds no difficulty. If there is any advantage the driver should be located so that he is in the best position when passing vehicles running in an opposite direction, for they are then moving at greater relative speeds than if the truck is passing another vehicle moving in the same direction.

A more important point is when turning completely around in a street. If the ordinary rules and traffic regulations in most cities are to be followed, the truck must keep to the right side of the street and turn to the left, and if the truck is equipped with a large body which will prevent the driver from looking back, the latter can, if the steering wheel is on the left side, look around the body to the left.

The point which is more important than either of the above, particularly with trucks that are used for delivery purposes, is the fact that if the steering wheel is located on the right side it is in a position which interferes more or less with getting on and off the truck conveniently; whereas if the wheel is on the left side both the driver and helper have free access getting on and off, passing out parcels, etc. —Commercial Truck Co. of America—E. S. Hare.

Right-Side Drive Very Satisfactory

Chicago, Ill.—Regarding right and left-side control for motor trucks for city work, we find the right-side drive and the left-side gear shift a very satisfactory proposition, affording a great saving of time and being more convenient for the driver and his helper. The reason for this is that the man who obeys the road regulations will always pull up to the right side of the road. He can step from the seat to the curb and saves the time of walking around, which, of course, is wasted.—R. S. Mattoon Motor Car Co.—R. S. Mattoon.

New York, N. Y.—A number of manufacturers of touring cars have in the last year offered their customers the option of the steering post being on the right or left side of the car but I believe that there is really very little difference between the merits of the two methods It is, in my opinion, entirely a matter of the driver becoming used to sitting on the right or left side of his car, whether it is a touring car or a truck. There is no difference in cost of manufacture for placing the steering post on either the left or right side, and it involves only slight changes in the steering connections and front axle pivots to have the control altered from one side to the other. A driver sitting on the right side when turning to the right on a crowded street can see better than man sitting on the left side; conversely, a man sitting on the left side when turning to the left can see better than the man sitting on the right.

When overtaking a vehicle traveling in the same direction I do not believe that there is any great advantage in one method or the other if the driver is at all careful. The entire matter, I believe, is summed up in the driver, who, if he is careful, can get equally good results from either the right or left side.—Knox Automobile Co.—R. F. Allcutt.

Some Points in Favor of Left-Side Drive

San Francisco, Cal.—I am a believer in the left-side drive for use where it is necessary to meet to the right and pass to the left, where vehicles stand with the right side to the curb, and in turning around to go in the opposite direction if the driving rules direct that the turn shall be made to the left; because, first: In getting in and out of the vehicle the driver does not have to go around it into the street, but can step on the curb, eliminating the danger of his getting mixed up with the traffic passing the truck on the outside. Secondly: When he pulls away from the curb he can see the traffic to the left of him better from the left seat of the truck. Thirdly: When he meets another vehicle going in the opposite direction he meets it on the right side and can have a better view of the relative positions of the vehicles.

If he wants to pass another vehicle going in the same direction he can see by the vehicle—whether a wagon, another motor car or a street car—a great deal better and thus lessens the possibilities of collision. When the driver wants to turn around to go in the opposite direction he can see the traffic he has to cross in front of better from the left side. If he wants to turn a corner to the right the seat on the right side is better, but if he wants to turn a corner to the left the seat on the left side is better, so that there is no choice of positions on that point, because he will turn as many corners to the left as he will to the right. As to looking behind him, he can look behind as well from one position as from the other, but, in my opinion, no driver should ever look behind him. He should have a mirror on each side of his car or truck in which he can look and see what is coming on either side without taking the chance of running over somebody in front of him while he is looking backward.

In England and in British Columbia, where the rule of the road is to meet to the left and pass to the right, the right-side drive is better, in my opinion, for exactly the same reasons that the left-side drive is better in the United States.—The White Co.

Bridgeport, Conn.—Right-side drive is an accepted design; the right hand is usually the stronger, being free to use a speed lever and emergency brake. It is important that the truck be driven with caution to the curb, or in passing standing trucks or horses; traffic passing in opposite directions generally gives heavy trucks plenty of room. In designs where the seat is over the motor the driver usually has a lear view when turning either to right or left. Of course, here is an objection when he passes to the left and has iis view obscured, but heavy trucks being slow moving, this arely happens.

An especially important feature is that, in backing up to curb or platform it is frequently necessary to change from everse to first speed several times. With the driver sitting t the right side and looking back this is very easy; but if e sat on the left with controlling levers in the center it ould be very difficult. According to an experiment made y us it was found that nineteen out of twenty drivers preerred right-side drive.—Locomobile Co. of America—A. W. obinson.

isadvantages in Left-Side Drive

Milwaukee, Wis.—There are advantages and disadvanages in the left-side drive. The first disadvantage would be hen going up to a loading place or curb the driver could not

ADVANTAGES OF RIGHT-SIDE CONTROL

(Continued)

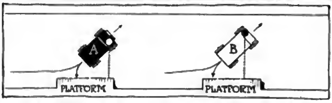


Fig. E—When backing up against a platform it is frequently necessary to change from reverse to first speed several times. With the driver at the right side, as in A, a clear view can be had of the platform and the truck can easily be backed to the right spot. B, however, sitting on the left, has his view obstructed by the body of his truck.

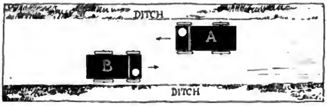


Fig. F—When going along a narrow country road, bordered on either side by ditches, the only way to keep out of the latter is to keep a very careful eye on them. The two trucks, A and B, are controlled from the right side and can do this. If they keep close to the edge of the road, respectively, they just clear each other.

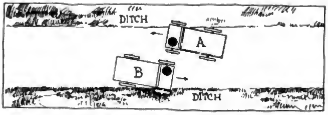


Fig. G—Here, however, each truck has left-side control, and the drivers do not have a clear view of the ditches. They see each other approaching and, in order to avoid the possibility of collision, steer to the right slightly. Both of them land in the ditch, from which the drivers' attention has been distracted.

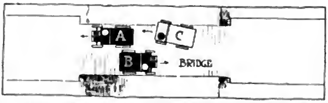


Fig. H—Most bridges in rural districts are unprovided with a rail of any kind, and there is always a danger on a narrow bridge that a vehicle may topple over into the river or stream. By keeping a careful eye, however, on the edge of the bridge, as A sitting on the right, the bridge can be safely crossed. C, however, sitting on the left, gives more attention to B approaching him, and in order to clear him lands in the stream.

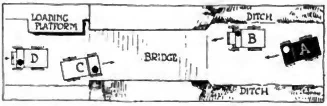


Fig. I—Loading platforms, curbs, ditches, standing car B, running car D, are all dangers to A on the right side, while his only danger on the left side is the vehicle C, coming in the opposite direction, who has a clear view of A's approach and can avoid him.

This Driver, with Left-side Control, Coming Down Center of Road, Has a Clear View of All Traffic Standing or Approaching

The Right-Side Controlled Truck Cannot Be Steered so Accurately, as Traffic to the Left Is Partly Hidden

judge his distance. Another disadvantage is by turning out of the way on a country road the driver would be liable to run into a ditch, as the distance is very hard to judge, especially on the truck.—American Automobile Co.—A. E. Ratfauf.

CINCINNATI, O.—Regarding the relative merits of right and left-hand control for truck work, it is my observation that one is as good as the other. I believe it is about the same as a right or left pitcher. Sometimes the south paw wins and the right-hand fellow loses. It is about the same as a single keyboard and a double keyboard on the typewriter—it is all pretty much the way you get accustomed to it at the beginning.—Automobile Co.—Robert C. Crowthers.

Always An Advocate of Left-Side Control

PHILADELPHIA, PA.—I have always been an advocate for left-side control on both trucks and pleasure cars; to my mind it is certainly the correct side. The truck driver passing another vehicle in a narrow or congested street can judge to a nicety by a single glance how much clearance there is between the vehicles. The only time that the driver sitting on the right may have a slight advantage is on a narrow country road, when he would have to keep his eye both on the ditch and the vehicle coming in an opposite direction.

When turning to the right the advantage is again with the left-side control, for the driver can see farther down the street, locating any vehicle or passenger in his road. Turning to the left, if he makes a wide enough sweep, the advantage is again obvious, for he can gage the distance between any moving object coming in his direction which would pass on his left.

The rule, I believe, in every state is that one vehicle overtaking another should pass on the left. This again favors the left-side control. The driver whether sitting on the right or the left looking back over his load before turning, with an unobstructed view, can locate any vehicle coming in his direction equally well, so there is no advantage to either.

Right-side Controlled Truck Keeping Close to the Curb, Thus Avoiding All Chance of Collision

The driver sitting in front of a van or such load that he is unable to have a clear view behind him certainly is favored by the left-side control as he can look over his side for any vehicle coming up behind him. There are usually two or more men on a load of these dimensions so that look out could be kept from either side.

On stopping at a curb the driver on the left is again benefited as he can dismount directly on the sidewalk without having to walk around his truck, there being no levers or other impediments which prevent him doing so. It seems therefore that the preponderance of advantage is certainly with the left-side control.—The White Co.—Fred G. Browning.

CLEVELAND, O.—Regarding the relative merits for right and left-side control for trucks, the electric vehicle manufacturers have universally and for a number of years used only the left-side drive. The arguments in its favor have seemed to us to be unanswerable, especially in city work, where traffic ordinances are more or less strictly in force. A man is compelled to stop on the right-hand curb. If he wishes to back his car to the curb he can, when sitting on the left, readily see who is coming behind him at any angle which he may turn.

Again, our experience has shown that the very great majority of accidents occur in crowded sections with passing vehicles going in the opposite direction. The man on the left can see how close he is to the vehicle approaching him without any difficulty.

Further argument is that when stopping at the curb a man can readily get out of his car at a sidewalk without being compelled to climb over his steering wheel and controlling levers, or get out of the left and walk around the front of his car. In turning to the right on a crowded street the vehicle's proper position is close to the curb, and, again, the left-side drive is preferable. In turning to the left he is in a position to see any cars which may be approaching him from behind and how close they are.

Generally speaking, it seems to us that the right-side drive is one of the surviving elements of horse-vehicle days, when a man sat on the right side of the wagons in order that when using his whip it would not be in the eyes or across the face of the person sitting beside him or be swinging around the back of the seat. Even with horse vehicles we find when the drivers dismounted from their teams they always walk on the "nigh" side. In fact, there are so many arguments in favor of the left-side drive for trucks that we are at a loss to understand how any person can sell a right-side drive car. —Baker Motor Vehicle Co.—Geo. H. Kelly.

Little Real Advantage on Either Side

CHICAGO, ILL.—The writer has operated both pleasure cars and trucks with both styles of control, and so far as his experience goes, there is little real advantage in one side over the other. We think a decided advantage, however, would be obtained by using a center control, owing to the fact that in getting in and out of the seat on a truck there is frequently an advantage in being able to climb in and climb out of the seat from either side. With center control it matters but little where the wheel is, on the right or the left side of the car, as in backing a truck into position at a freight or delivery platform it is usually necessary to see both sides of the truck and in delivering merchandise from house to house, except in large cities and on their principal streets, drivers usually place either the right or the left side of the truck or delivery van next to the curb as may be most convenient for them. We therefore think that in changing the operation levers that the center control should be preferred to either the right or left side.—Franklin Automobile Co.—Francis L. Thomas.

NEW YORK, N. Y.—The question of either right or left side driving is not a very important one on a large truck. It is our experience that the people who are handling a 5 or 6 ton truck usually have at least one man to go along with the driver in order to help haul the load and in this case when the truck is running along a crowded street and wishes to make a turn there is always a man on each side to look out and back or to put his arm out as a signal. In the case of a moving van body, the writer has often seen as many as five men riding on these vans and in this case there is usually a man outside of the driver on the right or left side besides a man handy on the other side of the car.—Hydraulic Truck Sales Co.—Morris R. Machol.

Right-Side Steer for Heavy Trucks

CHICAGO, ILL.—We are constructing at the present time the right-side steer and control for our commercial cars, believing there is no advantage in the heavy commercial car of the 2 and 3 ton type in having the left-side steer. Vehicles of this weight do not travel rapidly. In city work the right-side control is of advantage to the driver since he unloads from the right side of his vehicle to the loading or unloading deck unless he backs up—then there is an advantage because he would line up to the next vehicle, to the right mostly. In heavy traffic the commercial car of the 2 and 3 ton weight does not travel fast enough to pass all vehicles, it being unnecessary to have the left-side control or steer in order to see if the coast is clear before passing to the left of such a vehicle. As to vehicles coming toward each other and passing, it would make very little difference.

In country work by all means the right-side steer, it being necessary to travel on the right side of the road. In passing vehicles in the country a driver must be very careful in extreme loads or empty, and in many instances with a top heavy load, to avoid sliding into a ditch. With the right-side control he will be able to see. If his control were left side he would be unable to measure the exact distance to avoid difficulties of this kind. This condition would also prevail in the passing of vehicles on bridges, as most bridges at the present time in the country do not have side rails. This also applies to the passing of the vehicle traveling the same way, giving the driver a better opportunity to know how close he may travel to the vehicle to avoid a ditch on the left.

Truck with Right-side Control Turning to Left. Driver's View Intercepted by His Companion

In most instances, especially with the heavy canopy body most concerns are using at the present time, the driver is unable, whether left or right-side steer, to see back of his load or back of the body. It will be necessary, as things naturally develop, to give the driver a better opportunity to see what is back of him; that is, a better view of the rear must be given the driver.

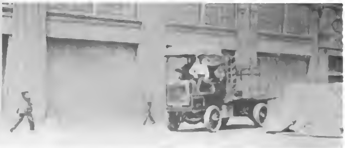
Then again there is the dumping body which is going to be used, since very poor arrangements have been perfected at the present time for the dumping of coal, sand and other wares. Invariably the driver must dump on the right-hand side of an alley. It is better for him, and since the mechanism for the handling of this dumping body is usually installed on the right, to have the right steer and control so that he is able to protect this dumping mechanism and know how close and how rapidly to get to a building or deck to dump. There is every advantage in the right-side steer over the left with the dumping body.—Velie Motor Vehicle Co.—M. H. Luce.

Left-Side Steer and Center Control

CHICAGO, ILL.—I am a firm believer of left-side steer and center control and believe that the disadvantages through this method of operation are so limited and the entire argument against it so weak that it should not be given serious consideration, while on the other hand, the advantages from the left-side control are so pronounced that I am surprised that it does not come into general use more promptly.

The traffic rules of all cities require stopping on the right side of the street in the going direction. This being the case, it is necessary with the right-side steer to leave the

Truck with Left-side Control Preparing to Turn to the Left. Driver Has a Clear View


Truck with Right-side Control Coming to the Left. In This Case the Driver Has Not Nearly so Clear a View

This Truck Has Right-side Control and Illustrates How This Arrangement Is Better for Right Turn But Not for Left

car from the left side, step into the street and walk around the truck to get to the sidewalk. This is very unpleasant, especially when the streets are muddy, and it is dangerous for the reason that the driver may thoughtlessly jump out of the truck directly in front of another truck. With right-side steer, when desiring to pass a slower moving vehicle going in the same direction, it is necessary to expose the entire truck before one is able to ascertain if there is a vehicle coming in the other direction. I can cite several accidents as the result of this condition. With left-side steer the truck is stopped at the curb stone and the driver is enabled to leave the truck and step directly on the sidewalk, eliminating the disadvantages above mentioned. In driving and when desiring to pass a slower moving vehicle going in the same direction one is able to see any object coming in the opposite direction without exposing the truck or putting it in the way of an opposite going vehicle. These advantages should be sufficient to make the left-side control popular immediately.

The reason for favoring center control with left-side steer is that it places it in a natural position to be operated with the right hand, and in these days of fore-door construction of bodies it is almost impossible to place it on either side and still have all the clearance necessary for operating the levers.

Another advantage of left-side steer is in turning around in the street. The traffic rules require that one should turn at the street crossing, and since a man drives on the right side of the street, naturally the turns are made to the left. It is only necessary, then, that the driver take one glance in the rear to determine if there is any car following and whether he has sufficient clearance to make the turn.

As above stated, there are so many advantages and so many reasons why left-side control should be popular that I am quite sure it is only a question of a short time until it will be universally adopted by all motor car manufacturers both for pleasure and commercial cars.—Studebaker Corporation—E. W. Arbogast.

A Truck with Left-side Control Taking a Right Turn; In This Case Right Would Be the Better Control

For and Against Right and Left-Side

MILWAUKEE, WIS.—In the following arguments for and against right and left-side control on motor trucks the writer has not taken into consideration any of the minor mechanical advantages claimed for either system. The arguments apply only to a vehicle where the position of the seat, type of body or the load prevent a clear view in all directions.

In a case where the driver can see over his load to the rear and has a clear view of both front wheels one type of concontrol, A is meeting B, another truck, and both have a good view of the amount of space between them, but A has a poor view of his distance from the curb, while B has an equally poor view of C, another truck, which he is overtaking. Under these conditions the responsibility of leaving clearance between B and C rests nine times out of ten entirely with B, as C is probably unaware of his approach or will keep a good distance from the curb on account of his poor view to the right. Clearly B's greatest danger is on his right, as C is not watching him and his left side is protected by the fact that A must be aware of his approach and is on the lookout. On turning to the right C again has the advantage of an obstructed view of the curb and the corner. On making a wide turn to the left he has the same disadvantage in regard to the corner curb diagonally opposite.

Let us consider right-side control under the same conditions. Both A and B are watching their passing clearance, but neither have as good a view as in the first example; however, A has a perfect view of the curb and in this way can give B more room, while B has a perfect view of his dangerous right side and of C; also if C happens to be aware of B's approach he can travel much closer to the curb without danger. In turning to the right or left C with right-side control, has the advantage over C with left-side control, of being always on the curb side of his car.

Suppose a car in discharging its load must back up to a door or platform. A driver D with left-side control is in the position to reverse to the door; he cannot look past the right side of his car without leaving his seat and his range of vision along the left side will not include the door. In this case he must maneuver until he is at practically right angles to the roadway so that he can see the door along his left side. On the other hand, when D has right-side control and is in the same position he has a perfect view of the door along the right-hand side of his car. From the above it would seem that the only possible advantage of left-side control over right-side is in the matter of meeting another vehicle going in the opposite direction and this is, in the writer's opinion, a very doubtful advantage. Loading platforms, curbs, ditches, rough gutters and other cars or wagons ignorant of one's approach present, by far, more dangers to the motor truck than vehicles going in the opposite direction. In fact, I have had cars damaged by all of these causes, but never in my entire experience operating motor trucks have I had a car damaged by a collision with a vehicle going in the opposite direction.—Commercial Auto Co.—Mitchell Mackie.

The Opinions of Actual Drivers

The opinions of the makers have been supplemented below by opinions from actual drivers, and the latter are or ought to be the people who are the best judges. Many of them appear to have driven left and right-side control trucks, and others do not seem to have formed an opinion on the matter at all.

One man who had driven trucks with both kinds of control considered left-side control the better, as he was from that position more able to judge approaching traffic. He preferred right-side gear-shaft. He was at present driving an electric truck with center steer and the controller on the right. He considered that the whole question was a matter of personal opinion and that opinion was based on habit and custom. Traffic could be signalled far better from the left side.

The opinion of this driver was backed up by another who thought that once a man is accustomed to a certain design then that design is the best for him to use. He thought right-side control better for signalling traffic, but left better in actual traffic. He was naturally a left-handed man, so he preferred left-side control for that reason. He was then driving an electric with left-side steer and control on left.

Another man driving a meat company's vehicle preferred left-side control in traffic, with gear-shaft levers on the right, as from this position he considered that he had a better view of the traffic, and could also more easily back to a loading platform. He found no trouble with regard to judging the right-hand curb from this position. He was then driving with left steer and controller on left. He preferred the controller to be in that position, as it left the right hand free to steer.

Accustomed to Sitting on the Right Side

A former horse driver who was questioned replied that he preferred the right-side control on account of his being accustomed to sitting on the right side of the vehicle.

That the right-side control was more natural was the opinion of a man driving a right-side controlled truck. He had, however, driven machines with both kinds of control, and considered that the best arrangement was that to which the driver was most accustomed. He thought that judgment of traffic could be made as correctly in both positions, as there are as many left as right turns in city work. He judged traffic behind him by aid of the store windows.

This Driver Backing His Truck, with Left-Side Control, into a Shed Has a Clear View of All Traffic on His Left and on Right

A similar opinion was given by the driver of a dry goods vehicle who said that when making left turns left-side control was better, but when making right turns right-side control was better.

One man preferred left-side control, but could not give his reasons for so doing; another considered that with open bodies neither had an advantage over the other.

Taking these examples as typical it may be assumed that the best arrangement is that which comes most easily to the driver, differing according to the custom of the latter. There seems to be a tendency towards favoring left-side control, but it must at the same time be admitted that right-side control also has its advantages.

Motorizing Buffalo Fire Department

ENTIRE motorization of the Buffalo, N. Y., fire department in the near future is being considered by the fire commissioners. Buffalo now has but one motor fire truck, that being the $8,500 motor combination chemical and hose wagon purchased last February from the American-LaFrance Fire Engine Co. of Elmira, N. Y. A second motor chemical fire truck has been purchased from the Victor Motor Truck Co., Buffalo, and the delivery of this motor truck is expected at any time now. The Buffalo fire commissioners have discovered that the motor fire apparatus now in possession of that city covers three times as great a territory as the old horse-drawn apparatus that it displaced early this year, and after arrival at a fire the service of the motor fire engine has been found much more effective. Within three years, Buffalo fire commissioners declare, the horse in the fire department there will be obsolete, and that statement means much when it is learned that Buffalo now has 350 fire horses and 150 horse-drawn fire vehicles.

Truck with Left-Side Control Taking a Right-Hand Turn

Truck with Right-Side Control Taking a Right-Hand Turn

Activities in the Motor Truck World

Canadian Autobus Co.—Next Winter's Shows—New Trucks from the Kelly and Marmon Truck Co's.—Mais and Morgan Truck Co.'s Reorganized —Big Truck Tests on the Pacific Coast and in New Jersey

AUTOBUS SERVICE IN MONTREAL

The Canadian Autobus Co., whose proposal to run an autobus service through the streets of Montreal has been ratified by the city council, has issued particulars of the manner in which it expects to finance the scheme and full details of the general way in which the traffic will be controlled.

There will be three garages, at Westmount, Outremont and East Montreal, with a total area of 15,800 sq. ft., and capable of housing 270 buses. The average number of miles covered during the day will approximate 2000. The number of employees it is proposed to employ will average about 7000 exclusive of the chauffeurs and have a salary list of $43,000 odd.

It is estimated that the actual capital necessary for the initial working of the autobuses will reach the sum of $2,400,000. It is anticipated that in the neighborhood of 48,000,000 persons will be carried every year on the various routes.

After a reference to the cost of gasoline for each bus which will average a yearly cost of nearly $200,000, the prospectus analyzes the future of the Autobus Co., in Montreal as well as in Toronto, and depicts the most hopeful augury for an excellent financial return on each proposition.

N. A. A. M. MEETING—NEXT WINTER'S SHOW

A meeting of all members of the N. A. A. M., now numbering about 95 leading manufacturers of complete vehicles, including gasoline and electric pleasure and commercial cars, is to be held next fall or winter; this was decided upon at the last meeting of the executive committee. The proposed general meeting of the association members may be called for the dates in October when the drawing for allotments of space at next February's Chicago show is held in New York. One of the objects is to give the representatives of the member companies of the association an opportunity to become acquainted with all of the other representatives. During the last 9 months many new members have been added to the association, and there have also been many changes of representatives of the older members.

Considerable attention was given to the subject of next winter's shows. St. Louis was removed from the local show circuit because the dealers' show in that city is held in October instead of in the winter, and the date would not fit in with others in the N. A. A. M. show circuit, decided upon last spring by the executive committee. There is to be no such a thing as a "National Show Circuit" this coming winter. No sanction has been granted by the N. A. A. M., nor will any be granted for any national show except those at New York and Chicago. There will be in addition a circuit of local shows so arranged as to avoid unnecessarily long journeys and consequent cost of transportation of cars and men. At these shows no manufacturer as such may exhibit. Under the National Association rules the exhibit must be made by the local dealer or branch house, but the manufacturer is permitted to send a chassis or other show vehicle and may of course be represented by salesmen.

The circuit of local shows is as follows: Cleveland, January 6 to 11; Philadelphia, January 20 to 25; Detroit, January 27 to February 1; Minneapolis, February 10 to 15; Kansas City, February 17 to 22; Pittsburgh, March 3 to 8; Boston, March 8 to 15, and Buffalo, March 17 to 22.

Plans for next winter's Chicago show, already well under way both at Manager Miles' tower office in Maine and the decorators' in Chicago, were discussed, but the arrangement of spaces was left to the discretion of the manager.

ANOTHER LIGHT DELIVERY TRUCK MAKER

A new light delivery truck maker is on the horizon. The Durant-Dort Co., Flint, Mich., has decided to manufacture light delivery wagons and has accordingly obtained sufficient material to proceed with the manufacture of 100. The design will be modeled on the horse-drawn vehicle at present manufactured by the company. Twelve months have been spent in experimenting and making a thorough analysis of the situation.

A NEW 5-TON TRUCK

Three-ton trucks have till now been those turned out by the Kelly Motor Truck Co., Springfield, O. The company is now, however, experimenting with a 5-ton truck of their own make, and it is thought that a 5-ton truck will be added to their 1913 models.

MARMON LIGHT DELIVERY TRUCK

The Nordyke & Marmon Co., Indianapolis, Ind., has placed a light delivery truck on the market. This company has heretofore confined its attentions to the pleasure car. The following are among the specifications of the new delivery vehicle: Capacity, from 1200 to 1500 tons; 4-in. bore, instead of 4½-in. bore used in the Marmon 32 pleasure cars; automatic governor, limiting the speed of the truck to 20 miles an hour; dual rear wheels, carrying pneumatic tires 32 x 4; wheel base, 120 ins.

MOTORIZING RAILROADS IN ALASKA

Since the building of the White Pass and the Yukon railroad in Alaska a stage line has been maintained between the northern terminus of the line and Dawson, requiring from 350 to 500 horses to operate successfully. In order to see whether or not motor traction would be a better proposition, the W. P. and Y. R. have recently bought a Knox 2-ton truck. This is now in operation and it is apparent that the ultimate intention of the company is to supersede horse traction by motor traction. The route is very rough and there are many steep grades, but the Knox motor truck is bearing the severe test well.

REORGANIZATION OF THE MAIS MOTOR TRUCK CO.

The Mais Motor Truck Co. has been reorganized. The new president is Frank H. Wheeler, of Wheeler & Schebler, who holds half of the stock. The board of directors includes the following: the president; Walter M. Pearce, vice-president; Alvin S. Lockard, secretary and treasurer; William H. Brown, former president; Jacob V. Stimson, and Harry G. Francis. The company is incorporated with $1,000,000 capital. No details are forthcoming until the sale of the property by the receiver to Frank H. Wheeler, Walter N. Pearce and H. G. Francis has been approved by the court. The liabilities are approximated at $250,000. The sale price is to be paid as follows: One-third in cash, one-third in 12 months and the remaining third in 18 months.

SERVICE STATIONS FOR IGNITION DEVICES

The Splitdorf Electrical Co. will establish after this month a new service station in New York, at 18-20 West Sixty-third street, where every Splitdorf ignition device will receive attention. The new station will be under the charge of Oscar J. Rohde, who has been New York manager for several years. One of the most striking features of the Splitdorf service stations will be miniature factory equipment for installing ignition and lighting outfits in a systematic and time-saving manner.

LA FRANCE AUTO APPARATUS FOR VANCOUVER

The city of Vancouver will buy three pieces of American La France auto apparatus. This decision was reached by the city council recently at a special meeting. The apparatus will include two auto hose wagons and one combination chemical and hose wagon, amounting in all to $20,780. The auto hose wagons will cost the city $13,500 and the combination another $7,370.

Tenders for these pieces of apparatus were invited by the city early in the year and after several committee recommendations had been made and for one reason and another rejected, it was decided to ask for competitive tests. Most of the tenderers agreed to send their apparatus to the city, but when the city later decided to buy a pumping engine from one of the firms without a test nearly all the others withdrew. The only companies which finally sent machines here to be tried out were the American-La France and the Garford. The price of the Garford company for the three pieces was about $4,300 less than the American-La France quotations.

LONG DISTANCE LUMBER HAULAGE TEST

One of the largest operators of the Pacific Coast has recently tested the efficiency of motor transportation as compared with horse equipment for the delivery of lumber from San Diego to Miramar, a distance of about 20 miles, the lumber hauled being used in the construction of a private residence costing upward of $150,000. The Western Lumber Co. is using two Mack trucks of 5 and 7 tons capacity each and these trucks are equipped with the derrick for quick unloading by means of which it is possible to put the full load on the truck in about 5 minutes. One of these trucks equipped with a derrick has transported in 10 hours to a distance of 2 miles from the docks 40,000 ft. of lumber. The lumber arrived so rapidly that the company had to use their entire force in order to prevent the congestion of their terminals, so efficient was the transportation by motor trucks. The best work that the company could do in a day's time with a team of horses and driver was three loads of about 1500 ft. per load. Their service would not have shown up so well without the use of the derrick device to facilitate the keeping of trucks in constant motion in which the highest dividend earning possibilities of motor transportation are always obtained.

REORGANIZATION OF MORGAN TRUCK CO.

The Morgan Motor Truck Co., of Worcester, Mass., has recently been reorganized, with a reduction of the capital stock from $1,100,000 to $300,000. The following are the chief officers: Charles B. Foster, president; Evan F. Jones, treasurer; Charles H. Derby, clerk; and Jerome R. George, John E. Bradley, Charles B. Foster and Lancaster P. Clerk, directors.

AMERICAN-LA FRANCE TRUCK TEST

An American-La France commercial vehicle was recently put through a severe test at Bergen, N. J. The truck has a capacity of 5 tons, but was loaded with 11,200 pounds of paving brick and a trailer containing 11,500 pounds of the same material was then attached. The Manly hydraulic drive system is the distinctive feature of the vehicle that underwent the test.

The truck, which has a 48-horsepower engine, picked up this total load of 11.4 tons in fine style, attaining a speed of 11 miles an hour over a level stretch of dirt road. Frequent stops and starts were made, but not once did the vehicle have any trouble in resuming progress. This type of transmission enables the driver to stop his vehicle very suddenly without any risk of any kind of damage resulting to the truck.

A hill having an 8 per cent. grade was then tried and the truck negotiated it without any difficulty. The truck was stopped twice on the grade, once at the beginning of the rise and the second time at its steepest point. In spite of its heavy load, the truck picked up speed as soon as it was started after each of these stops and the ascent of the hill was made at 5 miles per hour.

The motors on the jack shaft serve as brakes and differential, receiving the motive energy in the form of oil, by which they are charged by the pump. They transmit the power to the jackshaft, which is chain coupled to the rear wheels. The motors act as brakes, when the stroke of the pump piston is reduced to zero by means of an eccentric shaft revolving in a sleeve whose position can be changed to concentric by moving the controlling lever to neutral. The 5-cylinder pump, has its cylinders built in the form of a star and this is directly connected to the driving shaft of the engine; it is located midway between the flywheel and jackshaft. Each motor consists of five cylinders which are arranged in the same manner. The stroke of the pistons is fixed in the motor.

The 5-Ton American-La France Truck Undergoing a Severe Test Recently at Bergen, N. J., Carrying a Total Load of 11.4 Tons

Conditions of Trade

Reports from Centers with Regard to Motor Truck Sales from July 15th to August 15th

BUSINESS in the motor truck field has been fairly good during the last month and everything seems to promise excellent sales for the fall and the winter.

Truck Business in New England Is Good

BOSTON, MASS.—Though the motor car business as a whole has been recently in the hay and grass season that always comes with the change in the models, it cannot be said that the truck business in New England has suffered any diminution. Indeed the mid-summer season has been first class, according to the leading dealers, who handle trucks and delivery cars not only in Boston but through the New England territory. The season model does not bother the truck men at all, nor does the touring season make any difference. It is noticeable that quite a number of business establishments are installing trucks this summer, or placing orders for autumn delivery, so as to be better prepared for the winter traffic problems.

Recently the light delivery car has been the more prominent in local sales, owing probably to the fact that one of the largest Boston department stores, the William Filene's Sons Company is on the point of opening its new store in the heart of the retail district, and is putting in service a fleet of Ford delivery cars to handle the delivery work of the new store. Already a dozen or more of these cars, neatly lettered with the firm's name, have been put in service and it is understood that others are to follow. The Autocar company is also putting out many new cars for service in delivery of goods from several of the down town department stores. Next to the light delivery cars the 3 and 3½-ton trucks appear to be the most popular with buyers. Concerns with factories within a 25-mile radius of Boston are still heavy buyers of trucks, and while some of them are purchasing the larger sizes, the majority stick to the 3 and 3½-ton sizes. There also is reported considerable demand among contractors, coal dealers and others for the 5 and 6-ton trucks.

Quiet Times in Philadelphia

PHILADELPHIA, PA.—Comparatively speaking, trade in the commercial vehicle field during the July-August period with but few exceptions has experienced the quietude that is customary during the dull season in other businesses. Inquiries are numerous, however, and prospects excellent for a large fall trade, more attention being paid to the latter than to the prospect of immediate sales. Mr. L. M. Kenney, of the Service Motor Truck Co., has adopted this scheme, in pursuance of which he is following up the chain of county fairs with an exhibit, with the result that the next month will show an increased number of bookings and requests for demonstrations. Best sellers are the 1 and 1½-ton gasoline cars, the demand being from miscellaneous sources—grocery concerns, brewers, etc. The company during August has sold a fleet of three 1½-ton cars to a department store.

The smaller gasoline trucks of 1, 1½ and 2-tons capacity, seem to have the call, they being especially adaptable for service in the delivery of large businesses working from a distributing centre and transporting merchandise to the various centres of retail trade.

Locally, the largest single sale during the past month was a fleet of three commercial vehicles to the Arnholt & Schaeffer Brewing Co.—one 3 ton, one 1½ ton and one 1500 pound truck. Two passenger buses and a "bank on wheels" contracted for by the Guaranty Title & Trust Co. are other notable sales effected. Mr. Hawley, of the White Co., reports inability to secure sufficient cars to supply the demand.

In addition to manufacturers being absent from the city complaint is also made of the tightness of the money market and the reluctance of the stay-at-homes to invest. That this situation will soon be relieved, however, is only a question of a short time.

Milwaukee an Exellent Field

MILWAUKEE, WIS.—The manner in which Milwaukee business men are taking hold of the electric commercial vehicle was the feature of the past month's business. The impetus given to the electrically-propelled car is due in a large measure to the work now being done by the Milwaukee Electric Railway & Light Co., the sales department of which represents several electric pleasure and commercial car manufacturers as local distributors. The company uses a dozen or more electric trucks in its railway, light and power service, and advertises them well. Several electric cars, ranging from 1000 to 7500 pounds capacity, have been placed by the electric company and other agencies in Milwaukee during the last month.

Good Conditions in Kentucky

LOUISVILLE, KY.—Conditions are good in Louisville and Kentucky. There is every prospect of one of the finest seasons the industry has ever known in Kentucky and the South. The Kentucky Wagon Manufacturing Co. is doing fine business in "Urban" electrics.

A fleet of electric commercial cars has been received and put into commission by the Louisville Gas Co. and Louisville Lighting Co. Three 1-ton Waverley trucks and 6 Waverley runabouts have been delivered as per an order which was placed with the Longest Brothers Co. by the public utilities some little time ago. The Transit Motor Car Co. is busy manufacturing several models of big Transit trucks, but is not yet prepared to announce the purchasers of the new vehicles.

Great Increase at Toledo

TOLEDO, O.—The demand for trucks by large Toledo concerns has increased marvelously through the summer and the past 3 or 4 weeks have been the busiest that local dealers in commercial trucks have ever experienced. Baumgardner & Kirby, Toledo dealers, have recently placed motor trucks in four of the largest wholesale houses of the city and are now figuring on a $10,000 order which will be placed within a short time.

The Fremont Central Delivery Co., of Fremont, O., is making arrangements to replace its horse-driven vehicles with motor trucks. A light delivery truck was recently received by the company and will be used for delivery outside the city limits. The Kenton Delivery Co., of Kenton, O., has concluded to replace their horses and wagons with motor trucks.

Baltimore to Be a Front Rank Buyer

BALTIMORE, MD.—Conditions here were variable, good and fair. The same local conditions that have proved a nightmare to the dealers on various occasions still prevail, namely, the high hills and rough cobblestone streets, in addition to the great amount of digging that is now in progress in finishing up the work on the new and up-to-date sewerage system. When this last named work is done it will mean the beginning of an era that will place Baltimore in the front ranks as a community in which commercial motor vehicles are used. The sales in Baltimore are seldom made in fleets, but are usually made one at a time. Among the latest entries into the business field are several cars for the O'Neill Department Store; these are White delivery wagons.

A Record in Buffalo

Buffalo, N. Y.—During the past 4 weeks more motor trucks have been sold by dealers in this city than during any 1 month in the history of the motor truck business. From July 15 to August 15 motor truck business fairly hummed with orders and the rushing demand for the lighter commercial motor vehicles for delivery service has not diminished by any means since the latter date. Grocery firms, cleaning and dyeing houses, laundries, ice cream factories, bakeries, dry goods stores, furniture moving establishments are contributing greatly to the increasing demand.

The Atterbury Motor Truck Co. declares the business in the sale of 1, 2 and 3-ton trucks is better now than they have ever experienced. Business is excellent in sight-seeing cars and hotel omnibuses.

Columbus Shows Well

Columbus, O.—Despite the fact that it is the vacation period for business men, still the past month has been a good one in the motor truck industry in the Buckeye capital. Business has been about equally divided between 1-ton and 2-ton vehicles. There is an exceedingly good demand for the smaller delivery wagons, carrying from 500 to 800 pounds, from grocers, many of which are installing the motor-driven delivery service. Another business which has taken up the commercial vehicles is the commission men and several concerns have purchased heavy trucks. Agents are beginning to realize the possibilities of Columbus.

Great Truck Boom at Rochester

Rochester, N. Y.—Rochester and vicinity is experiencing the greatest motor truck boom in history, and as a result almost every local dealer reports more sales of light commercial vehicles and motor trucks for the period covering the last 4 weeks than for any similar period in the truck business. John Cunningham reports strong demand for Federal and Speedwell trucks; Motor Truck Sales Co. states demand is brisk for Mack and Sauer trucks, while the Mandery Motor Car Co. has strong demand for Packard vehicles and invariably dealers report business as being exceptionally active. The southern section of the state also reports strong demand for motor trucks, especially at Elmira, N. Y., where dealers are greatly pleased over results for the past 2 months.

Little Activity at Wilmington

Wilmington, Del.—Between July 15 and August 15, while the market could not be considered stagnated, there was little real activity in the motor truck trade here, and few merchants had any sales, though there were some inquiries. There is no particular reason for this situation, and the indications are good for fall trade.

Light Trucks Sell in Winnipeg

Winnipeg, Man.—The commercial vehicle situation in Western Canada at the present time shows a demand chiefly for the lighter type of vehicle, suitable for grocers, wine and spirit merchants, jewelers, department stores, etc., although several larger trucks of 3-ton capacity have been recently delivered to the T. Eaton Departmental Store, bringing up the total number of trucks employed by this one concern to 15. The demand in the commercial vehicle line has been very steady throughout the past year, and has shown no particular spurt during any one month.

The City of Winnipeg is adding motor vehicles to all of its different departments and has placed in service gasoline cars for the construction department, electric cars (4) for the City Light & Power Department, and 3 gas tractors for the hauling of road material from City yards.

Among the Makers

Dealers in New York and Elsewhere Are Doing Well—Nearly All Report Better Sales Than Last Year's

The hot weather has been responsible for a good many sales, according to some. General trade conditions are good, although they have been somewhat easy.

The electric and gasoline vehicle field during the period from July 15 to August 15 on the whole appears to have been good, as although in most cases sales were less than in the month preceding, nevertheless if the same period is taken in 1911 and the two compared, the comparison is much in favor of this year.

The Lippard-Stewart Motor Car Co. has found that the general condition of the trade is good and that business during the period of July 15 to August 15 showed a normal increase, especially in the demand for delivery cars for concerns such as laundries, dairies, department stores, hardware dealers, dry cleaners, etc.

The general condition of the commercial vehicle business during the past 60 days, in the opinion of the Atterbury Motor Car Co., has been somewhat easy, although during the month of July there were 43 orders placed for motor trucks. No certain line of models is in special demand. The 1 and 3-ton trucks seem to be the leading models with the company, the 3-ton for wholesale grocers and brewers, and the 1-ton truck for furniture, pianos, etc. The sales increase during the month of June and July over last year was about 20 per cent.

The Waverley Co. says that its business during this period shows a decided increase over the previous and over the corresponding month last year.

The hot weather has not caused any heavy loss in horses, nor has it had any effect on the commercial vehicle field, says The Studebaker Co. All types of vehicles appear to be in demand, and there has been no particular demand for any one size.

According to The Peerless Motor Car Co. the general condition of the commercial vehicle business during this period was above normal. It was possibly greater in volume than that forecasted, based on the ordinary growth of business. The increase during this period was superior to that of the corresponding period of last year.

The condition of the Pierce-Arrow Motor Car Co. trucks was experienced were mostly the breweries and indeed, and the company has no cause whatever for complaints.

The particular lines of industry in which a demand for trucks was experienced were mostly of the breweries and similar concerns that do a large amount of business during the hot weather months. A considerable increase in business is shown in comparison with the corresponding period of last year.

The Universal Motor Truck Co. has had fairly regular sales; according to the Velie Motor Vehicle Co., more interest in trucks is being shown in Chicago, increased demands being shown; in New England the same company looks upon trucks as quite accepted, having sold many 3 and 2-ton trucks; with the Knox Co., business was excellent, the 3-ton model being most popular; and with the Alco trucks business was constantly good. Packard Co. reports a heavy increase over last year, and Federal Motor Truck Co. reports likewise. Many good sales have been made by the General Vehicle Co.

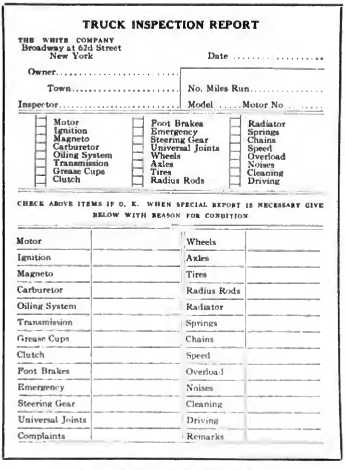
How the Dealer Looks After the Owner

Three Methods of Inspection Used by Makers—Specific Systems Maintained by New York Dealers—Inside and Outside Systems—Educating the Driver and the Owner

ALL the larger commercial vehicle dealers and manufacturers have many ways of taking care of their customers beside the regular service departments maintained for repairing the trucks and for supplying parts when needed. Of these various ways of looking after the owner the three most important are: First, the inspection of the customer's truck at intervals of at least once a month; second, the instruction of the customer's driver in the operation and care of a truck; and third, the substitution of a truck for that belonging to the customer if at any time his is laid up for repairs.

While the customer derives a great deal of benefit from these services, the dealer and the manufacturer also obtain advantages. There are four great benefits that the owner gets under the three services mentioned: First, the saving to him in repair bills is very large, as under the inspection system little troubles are discovered and remedied before they have a chance to develop into anything serious; second, his trucks are laid up for repairs less than would be the case if they were left entirely to the driver's care; third, he is enabled to keep better track of his driver and sees that he is doing his work properly; and fourth, he has a much better understanding with the dealer from whom the truck was purchased as he is thus brought in touch with him more often than would otherwise be the case.

On the other hand the dealer and manufacturer also receive four great benefits from these same services. First, by means of the inspection their guarantee is protected as cases of overloading, overspeeding and mistreatment of the truck are brought to their attention; second, if there are any defects in design they are discovered and remedied—for example, one manufacturer found that practically all of the inspection reports turned in to him for a time after placing a new model on the market showed an excessive amount of breakage of the forward spring clips and this defect was promptly remedied; third, a better class of drivers is obtained for their customers' trucks when they are taught by a man thoroughly familiar with the construction and operation of th particular truck that they are preparing to drive; and fourth, the customer's trucks are laid up for repair less when they are periodically inspected by an expert, resulting in satisfied customers and consequently repeat orders and a minimum amount of work in the service department of the company.



TRUCK INSPECTION REPORT

THE WHITE COMPANY
Broadway at 62d Street
New York

Date ....

Owner..............................
Town..............................
Inspector..............................
No. Miles Run..................
Model .....Motor No ....

☐ Motor
☐ Ignition
☐ Magneto
☐ Carburetor
☐ Oiling System
☐ Transmission
☐ Grease Cups
☐ Clutch
☐ Foot Brakes
☐ Emergency
☐ Steering Gear
☐ Universal Joints
☐ Wheels
☐ Axles
☐ Tires
☐ Radius Rods
☐ Radiator
☐ Springs
☐ Chains
☐ Speed
☐ Overload
☐ Noises
☐ Cleaning
☐ Driving

CHECK ABOVE ITEMS IF O. K. WHEN SPECIAL REPORT IS NECESSARY GIVE BELOW WITH REASON FOR CONDITION

Motor		Wheels	
Ignition		Axles	
Magneto		Tires	
Carburetor		Radius Rods	
Oiling System		Radiator	
Transmission		Springs	
Grease Cups		Chains	
Clutch		Speed	
Foot Brakes		Overload	
Emergency		Noises	
Steering Gear		Cleaning	
Universal Joints		Driving	
Complaints		Remarks	

Form of Report Used by the White Co.

Larger Companies All Inspect Vehicles

Inspection systems are maintained by all the larger concerns having commercial vehicles in service. There are three systems of inspection, the one most in use being the employment of a corps of inspectors who make periodic calls on the firms using their trucks; the next in favor is the granting of certain periods of time in each month for the customer to send his vehicles into the service station for inspection, and the third system, being a combination of both of the preceding ones, is used chiefly by the dealer or manufacturer, some of whose customers keep their vehicles at the service station.

The first system is by far the most expensive to the dealer and the most complicated, but it has its advantage over the second in that it is very hard as a rule to convince the user that laying his truck off for a day or one-half day each month will result in a saving to him at the end of the year, and it is still harder, if he is once convinced that such a proceeding will be a benefit to him, to persuade him to send in his trucks regularly as he is inclined to be ruled by the fact that a day's loss of a truck will cause deliveries to pile up and cripple his delivery system for that week. This is no doubt true, but it is equally true that if his truck is not looked over regularly the moving of his goods will be much more retarded when something serious does happen, and it is beyond reason to expect that a motor vehicle will hold out forever against the rough usage and the lack of care it experiences in the hands of the average driver. To this human factor, indeed, most of the problems that the manufacturer has to deal with are due, and the problem of inspection is not the least of these.

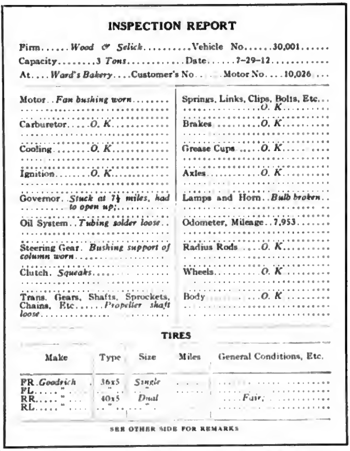
Among the commercial vehicle dealers in New York City fifteen out of eighteen employ from one to three inspectors whose sole duty it is to look after the cars their company has in service. The White, Peerless, Garford, Detroit, Waverley and General Vehicle trucks are inspected once a month by heir respective companies. The Pierce makes regular in-pections every two weeks, but after it has been ascertained hat the truck is getting the proper care and attention the nspections are made once a month. The rule of one in-pection a month is not strictly adhered to, as the inspector sometimes goes back within a day or two after he has made uggestions to an owner or driver to see that his recom-mendations are being carried out. The Knox, U. S. Motors, tudebaker and Kissel companies make inspections every 2 weeks. Inspectors for the Velie and the Universal make heir rounds once a week. The Alco leaves the frequency of nspections to the inspector's judgment, who varies it according to the conditions under which the truck is being used. The same conditions govern the Garford in the frequency f its inspection. The Alco keeps one of its inspectors in he service department as an emergency man. When the Buick delivers a truck it makes frequent inspections until atisfied that the vehicle is receiving proper attention and hen the inspections are made at greater intervals. The Universal and Detroit Electric use the combined system of nspection; that is, inspection at the service department and lso outside, as some of the owners of each make keep their ars at the service stations. The inspection of the trucks tored in this way is made every night in the Universal garage and once a week in that of the Anderson. The Gramm people set aside days in their service department or the examination of customers' trucks, and under the maintenance contract which this company has with some of ts customers their cars are inspected once a week, as in his case the vehicles are kept at the service station. The days on which customers are to bring in their trucks for nspection are arranged to suit their convenience.

The Packard Uses Inside System

The Packard uses the inside system of inspection, the cars being taken to the service station once a month. As an example of arranging this service to suit the convenience of the customer, the Packard trucks in use by express companies are brought in for inspection on Mondays, as that is a dull day in the express business.

The inside method of inspection is being used by the Walter Co., the cars being taken to the New York factory for nspection once a month, and as some of the customers keep their trucks at the factory service station these cars are inspected once a week. The U. S. Motors, which handles the Sampson truck, gives a half day each month to each truck which the company has in use in the service station for inspection and repairs, but these half days are optional with the customer.

Practically the same method of inspection is followed by all the companies. The inspectors in making calls have their regular routes to go over, but the owners as a rule do not know when the inspection is to take place. Some of the companies reserve the right for their inspectors to stop the customer's truck on the street, board it and ride with the driver on his regular trip, afterwards making the mechanical examination of the vehicle. It is required by some of the truck dealers that their inspector drive the truck, trying it out on a hill if there is one near by, but with others the in-



INSPECTION REPORT

Firm......*Wood & Selick*..........Vehicle No......30,001......
Capacity........3 *Tons*............Date......7-29-12............
At....*Ward's Bakery*....Customer's No.......Motor No....10,026....

Motor..*Fan bushing worn*........
Carburetor.....*O. K*............
Cooling........*O. K*............
Ignition........*O. K*............
Governor..*Stuck at 7½ miles, had to open up;*..........
Oil System..*Tubing solder loose*..
Steering Gear. *Bushing support of column worn*..........
Clutch. *Squeaks*..............
Trans. Gears, Shafts, Sprockets, Chains, Etc......*Propeller shaft loose*..............

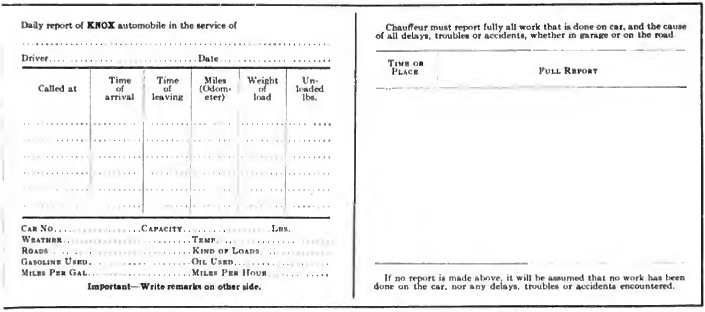
Springs, Links, Clips, Bolts, Etc...*O. K*..........
Brakes..........*O. K*..........
Grease Cups......*O. K*..........
Axles............*O. K*..........
Lamps and Horn..*Bulb broken*..
Odometer, Mileage..7,953.......
Radius Rods.....*O. K*..........
Wheels..........*O. K*..........
Body............*O. K*..........

TIRES

Make	Type	Size	Miles	General Conditions, Etc.
FR.*Goodrich*	36x5	*Single*		
FL..... "	"	"		
RR..... "	40x5	*Dual*		....*Fair*;....
RL..... "	"	"		

SEE OTHER SIDE FOR REMARKS

Copy of a Report Recently Turned In to the Peerless Co.



Daily report of **KNOX** automobile in the service of

....

Driver..................................Date........................

Called at	Time of arrival	Time of leaving	Miles (Odometer)	Weight of load	Unloaded lbs.

Car No..........................Capacity..........................Lbs.
Weather..........................Temp..........................
Roads..........................Kind of Loads..........................
Gasoline Used..........................Oil Used..........................
Miles Per Gal..........................Miles Per Hour..........................

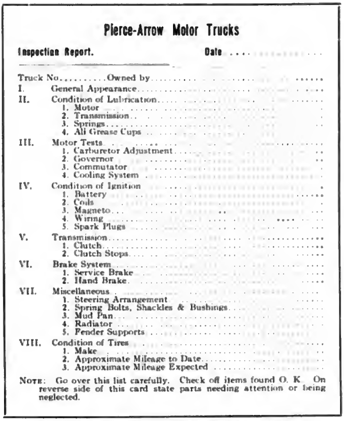
Important—Write remarks on other side.

Chauffeur must report fully all work that is done on car, and the cause of all delays, troubles or accidents, whether in garage or on the road

Time or Place	Full Report

If no report is made above, it will be assumed that no work has been done on the car, nor any delays, troubles or accidents encountered.

Form of Report Turned In by the Owner's Driver to the Knox Co.



Pierce-Arrow Motor Trucks

Inspection Report. **Date** ....

Truck No.........Owned by ....
I. General Appearance ....
II. Condition of Lubrication ....
  1. Motor ....
  2. Transmission ....
  3. Springs ....
  4. All Grease Cups ....
III. Motor Tests ....
  1. Carburetor Adjustment ....
  2. Governor ....
  3. Commutator ....
  4. Cooling System ....
IV. Condition of Ignition ....
  1. Battery ....
  2. Coils ....
  3. Magneto ....
  4. Wiring ....
  5. Spark Plugs ....
V. Transmission ....
  1. Clutch ....
  2. Clutch Stops ....
VI. Brake System ....
  1. Service Brake ....
  2. Hand Brake ....
VII. Miscellaneous ....
  1. Steering Arrangement ....
  2. Spring Bolts, Shackles & Bushings ....
  3. Mud Pan ....
  4. Radiator ....
  5. Fender Supports ....
VIII. Condition of Tires ....
  1. Make ....
  2. Approximate Mileage to Date ....
  3. Approximate Mileage Expected ....

NOTE: Go over this list carefully. Check off items found O. K. On reverse side of this card state parts needing attention or being neglected.

The Harrolds Motor Car Co. Uses This Form of Report

spector uses his own judgment concerning the driving of the truck. While the car is being loaded or unloaded the inspector makes a careful examination, paying particular attention to the lubrication, the governor, the motor, the gearbox, the wheels, the axles, the frame and the general condition and appearance of the body. All of these inspectors being expert mechanicians, they are able to make any minor repairs they may find necessary, but if they run across anything that they are unable to repair on account of lack of tools or through any other circumstances they make arrangements to send the car to the service department. Nearly all of the commercial vehicle companies agree that the inspector should ride with the driver in order to keep watch of the manner in which it is driven and also to see how the truck is running. These inspectors make notes on overspeeding and overloading and report any instances of the kind to their respective companies.

The inspectors make suggestions to the driver on the care and operation of his vehicle, calling his attention to any mistakes he may make and warning him of the serious results brought about by neglect of the car and also instructing him in making minor repairs.

After the inspection has been made the inspector sends in a report to his company either in the form of a letter or on a regular report blank, some of which are illustrated herewith. When the dealer receives the report he writes to the owner or sends him a duplicate of the report with an explanatory letter telling him what should be done and notifying him of any mistakes on the part of the driver.

Alco's Inspector Gets Receipt From Owner

The Alco inspector gets a signed statement from the owner of the truck after the inspection has been made stating that the truck has been turned over to him in a satisfactory state. He also makes a personal report to the company, giving all the information he has been able to obtain; for example, discovering if the owner is in the field for a new truck. The reports turned in to the International Co. and the Anderson Co. by their inspectors, respectively, are all signed by the customers. The Pierce, Peerless and Alco send duplicates of these reports to the factories. Besides the reports from its inspectors the Knox Co. also requires daily reports from the driver on a new truck for the first 2 months that he has charge of the vehicle. These reports are sent in in lots of six every Saturday. An illustration of this form of report is given on page 41. When cases of overloading or overspeeding are detected the owner is warned that any injury to the truck from these causes is not the fault of the truck and the manufacturer cannot be held responsible. The U. S. Motors void their guarantees if a customer persists in overloading or overspeeding after he has been warned. However, if a customer asks permission to use his truck for trailer work the company sends an inspector to investigate and if conditions warrant it the permission is given.

The Speedwell Co. cancels its guarantee if one of its customers continues to use the same driver after the Speedwell's inspector has recommended that a new one be employed. If a General Vehicle user overloads his truck the guarantee is cancelled. The various methods of report are all productive of the same results in that there is a copy placed on file in the dealer's office or service station and that the owner receives a notice of what has been done on the inspection and what should be done further.

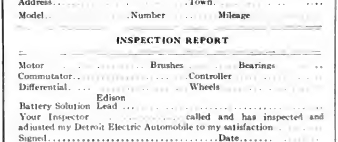
A report is made out in triplicate form by the Knickerbocker inspector. A copy of this report is sent to the owner of the truck, one is placed on file at the office of the company and the other goes to the construction department.

The schedule of the Baker Co. requires the inspector to call every month for the first 6 months that the truck is in service and each 60 days for 6 months more. After the vehicle has been in service a year the inspections are less frequent, occurring approximately quarterly.

Owner's Driver Instructed By Company

All of the companies agree in the placing of one of their drivers on a new truck to instruct the owner's driver. The length of time the instructing driver remains with the customer's truck varies considerably, some dealers keeping him there no definite space of time and removing him when they are sure that the new driver is thoroughly conversant with the care and operation of his vehicle. Other companies keep their driver on a new truck from 1 to 3 days, others from a week to 10 days and one company gives its drivers from 3 to 4 weeks to instruct a new driver. One company makes a charge for the driver's services if he has to stay more than 10 days on any one truck.

The Peerless gives a new driver a course of instruction in its service department lasting 1 or 2 weeks, the last part of the driver's stay being put in in road work. Pierce and the Studebaker also put the new driver through a course of instruction in their service departments if the customer requests it.



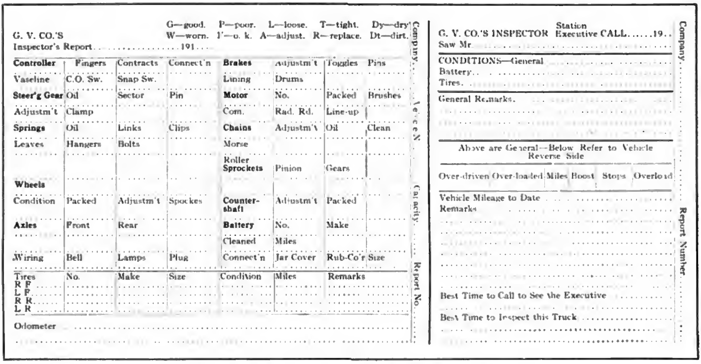
Name ....Date ....
Address ....Town ....
Model ....Number ....Mileage

INSPECTION REPORT

Motor ....Brushes ....Bearings ....
Commutator ....Controller ....
Differential ....Wheels ....
Battery Solution Edison Lead ....
Your Inspector ....called and has inspected and adjusted my Detroit Electric Automobile to my satisfaction ....
Signed ....Date ....

ANDERSON ELECTRIC CAR CO. OF N. Y.
Broadway and 80th St., N. Y. City

The Anderson Co.'s Report is Signed by the Customer



G—good. P—poor. L—loose. T—tight. Dy—dry.
W—worn. V—o. k. A—adjust. R—replace. Dt—dirt.

G. V. CO.'S
Inspector's Report.................191...

Controller	Fingers	Contracts	Connect'n	**Brakes**	Adjustm't	Toggles	Pins
Vaseline	C.O. Sw.	Snap Sw.		Lining	Drums		
Steer'g Gear	Oil	Sector	Pin	**Motor**	No.	Packed	Brushes
Adjustm't	Clamp			Com.	Rad. Rd.	Line-up	
Springs	Oil	Links	Clips	**Chains**	Adjustm't	Oil	Clean
Leaves	Hangers	Bolts		Morse			
				Roller Sprockets	Pinion	Gears	
Wheels							
Condition	Packed	Adjustm't	Spockes	**Counter-shaft**	Adjustm't	Packed	
Axles	Front	Rear		**Battery**	No.	Make	
				Cleaned	Miles		
Wiring	Bell	Lamps	Plug	Connect'n	Jar Cover	Rub-Co'r	Size

Tires	No.	Make	Size	Condition	Miles	Remarks
R F						
L F						
R R						
L R						

Odometer ....

Company........ Service %........ Capacity........ Report No........

G. V. CO.'S INSPECTOR Station Executive CALL......19..
Saw Mr...

CONDITIONS—General..............................
Battery...
Tires...

General Remarks.................................

Above are General—Below Refer to Vehicle
Reverse Side

Over-driven	Over-loaded	Miles	Boost	Stops	Overload

Vehicle Mileage to Date.........................
Remarks...

Best Time to Call to See the Executive..........

Best Time to Inspect this Truck.................

Company........ Report Number........

The Inspectors of the General Vehicle Co. Use This Style of Report

Whenever it is possible a truck dealer will substitute one of his own trucks if one belonging to one of his customers is laid up for repairs. There is no written contract to this effect, however, except in case the customer has maintenance contract with dealer, when the customer is guaranteed 100 per cent. service. Some of the companies render this service whether the truck is out of commission through defective workmanship or not, and with these companies there is usually a charge made for the operation of the truck, as the customer would have to pay operating costs on his own car if it were in service. Other companies are rather careful about lending the customer a truck, taking pains to investigate all conditions thoroughly before granting it. No dealer can afford to keep enough cars in reserve to meet emergencies of this kind, most of them keeping from one to three emergency vehicles on hand, besides their demonstrators which they can use to this purpose as well. The average number of cars in reserve in New York for this service is one to every twenty-four trucks in use, this being the complete average based on the number of motor trucks in use in the city. The number that each dealer has in reserve varies greatly, some having upward of 400 trucks in service and four or five in reserve, others having fifty or sixty vehicles in use and five in reserve.

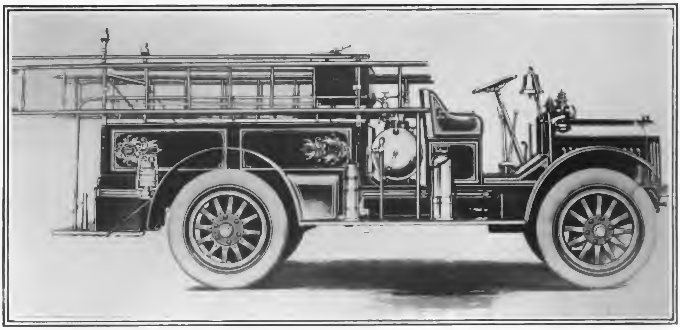
Permanent Features in All Systems

From the many and diversified systems of inspection given above it would be rather hard to construct a perfect system embodying the good points in all that have been given for they are all as complete as years of experience and study can make them, not to mention the fact that a dealer in another territory may encounter different conditions from those existing in New York City. There are several good points, however, that are worthy of attention more than any of the others. The signed statement given to the inspector by the owner of the truck, stating that the vehicle has been inspected and turned over to him in a satisfactory condition, for example, is a very good feature of any inspection system. It not only insures protection to the dealer or manufacturer against the responsibility for any trouble other than defective construction in the truck, but also acts as a check on the inspector as there is no other way of having positive evidence that the inspector is doing his work properly and effectively. Another good feature is the reports turned into the truck company by the driver. In this manner a daily record of the vehicle's work is obtained, which further insures protection to the dealer and also trains the driver to look out for his truck and to avoid those two great evils—overloading and overspeeding. Supplementing the driver's reports the reports made by the owner of the truck, if they are made out by the driver's helper or someone else unknown to the driver, are a valuable asset to the dealer or manufacturer as they serve as a check on the driver's reports and any discrepancy, however small, can be quickly discovered. A confidential report made by the inspector to the owner, and dealing exclusively with the latter's side of the question in regard to the care and attention the driver is giving the vehicle and his manner of handling it, would be of great value to the customer.

When a commercial vehicle breaks down the tendency of the owner is nearly always to place the blame on the manufacturer as the guarantees they are forced to give are, in most cases, interpreted by the customer in the wrong way. Therefore, the inspection system is a necessary asset to the manufacturer at the present time. However, it would seem that some company might be formed to give this service and to look out for the manufacturer's interests as well as those of the user of the truck. Such a company could employ competent mechanics to inspect the trucks at regular intervals and report to him. These men could also make any repairs necessary to the trucks or if he was not in a position to do the work he could call upon the service department of the company manufacturing the vehicle. No driver can be expected to give the truck the proper care and attention after he has returned from a hard day's work and such a system would result in a saving to the manufacturer and the owner.

The keynote of these various service systems is the same in each case. It is the education of the driver and owner to the highest degree, showing the one how he can increase his earning power by gaining a knowledge of the vehicle he is driving and pointing out to the other the means by which he can increase the efficiency of his truck or by which he can secure a better return on his investment by rearrangement of his delivery system.

MUNICIPAL SERVICE EXTENSIONS



Kelly Chemical Wagon, 1-Ton Chassis, Loaned by E. S. Kelly to the Springfield, Ohio, Fire Department

Fire Apparatus Cost

Motor-Driven Apparatus Gains Nearly Two Dollars Each Day and Is Far Superior to Horse-Drawn Wagons

DAILY COST OF MOTOR-DRAWN APPARATUS	
Decatur, Ill	**22 cents per day**
Springfield, Mass	**14 cents per day**
Richmond, Va.	**13 cents per day**
Average daily cost	**16 cents per day**
DAILY COST OF HORSE-DRAWN APPARATUS	
Springfield, Mass	**$1.90 per day**
Richmond, Va	**2.18 per day**
Average daily cost	**2.04 per day**
Average gain per day of Motor Apparatus	**$1.88**

THE motor-driven fire engine is day by day becoming more popular with municipal authorities. The latter find it impossible to deny the overwhelming merits the motor-driven fire engine possesses when contrasted with the horse-drawn engine. It is more efficient, it is cheaper, and it enables centralization to become more perfect, eliminating small sub-stations. The proof that these statements are actual facts and not airy conjectures deduced from theory lies in the reports which are issued annually by all fire departments in every town in the United States. These reports have been carefully read, and in innumerable instances it is found that the chief engineer recommends to the municipal body the purchase of motor fire engines during the coming year. So it may logically be assumed that the complete motorization of fire departments is only a matter of time and sufficient money.

These annual reports above referred to contain many facts which have a definite interest to any user of a commercial vehicle, and also have a direct bearing on the fundamental truths that serve as a foundation for the proof of the efficiency of the motor truck. The facts with regard to cost of upkeep are specially interesting. Some of these will be found below.

Horse-Drawn Apparatus a Thing of the Past

It was decided as a general opinion at the last convention of the International Association of Fire Engineers that horse-drawn apparatus was practically a thing of the past. Likewise, the modern motor tractor was looked upon as the coming means of propelling hook and ladder trucks, and steam fire engines. The chief engineer of the fire department of Richmond, Va., comments on these facts, and notices that many engineers still cling to steam as a pumping power. Whether this is so or not will be a matter for a future article.

The motor engine at Richmond has proved its worth, and is acknowledged to be far superior to the other machines. The Knox automobile combination pumping engine, chemical and hose wagon, during a period of five months, made over 50 runs, covering 75 miles, and pumped at fires for over 15 hours. For this work the cost of maintenance, including gasoline, lubricating expenses and repairs, during the 5 months it was used, amounted to $20.54. The cost of maintenance of the equipment that the motor machine replaced amounted, during that same period of 5 months, to $337.50. A saving was made of $317.06.

The motor machine made 50 runs, whereas the horse machine made only 17. The facts can better be seen in the following table:

	Cost for Five Months	Runs Made
Motor Machine	$ 20.54	50
Horse Machine	337.00	17.
Difference in favor of Motor	$317.06	33

The cost of maintaining the motor machine for a period of 5 months is only about 6 per cent. of the cost of maintaining the steam engine and its horses for the same period. The cost per day amounts to 13 cents.

Attention must also be drawn to the following points: the motor machine is by far more efficient in answering fire calls with celerity; the motor machine covers a greatly extended territory, and immediately after its return from one fire the motor machine is ready for another one, which is not the case with the horse steam engine, as fires within the engine have to be withdrawn, charge relaid, and the engine put in serviceable condition.

The following figures with regard to a motor engine installed in the city of Richmond are enlightening:

Alarms Responded to	Number of Horses Replaced	Practice Runs	Total Mileage	Gallons of Gasoline	Gallons of Lubricating Oil	Pints of Castor Oil	Pounds of Grease	Number of Repairs
29	5, and 1 engine and 1 combination chemical wagon	27	74 9-10	101	5	2 1 2	5	2

The horse-drawn machine that this motor-driven machine took the place of cost, for the same length of time, $350.00, responding to only 27 alarms of fire, working 2 hours less than the motor apparatus and making no practice runs.

The motor-driven machine is especially suited for the last-mentioned matter, namely, the making of trial runs, as there is no work at the end of the journey as there is at the end of a trip in a horse-drawn engine. Trips can be made whenever there is an apparent lack of fires, and thus the firemen can benefit by a far greater number of experiments at starting and making record time for both long and short distances in flat and hilly districts.

The fire department at Springfield, Mass., makes a very interesting comparison between the cost of upkeep with regard to the two kinds of fire wagons. The monthly expense of a single piece of horse-drawn apparatus is compared with the monthly expense of the piece of motor apparatus which superseded it. A comparison of the cost of maintenance for a single month of an electric ladder truck is compared with the cost per month of the 3-horse ladder truck which it replaced.

Comparison of Cost Between Horse and Automobile

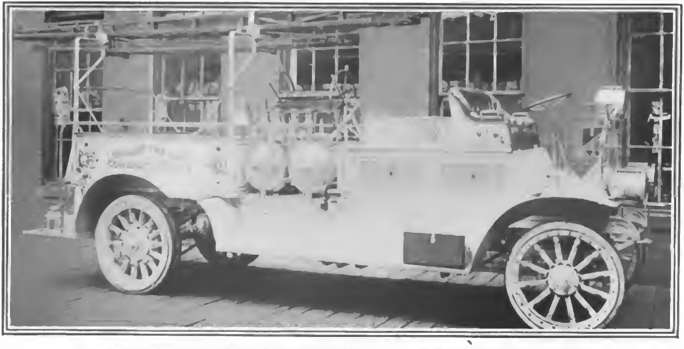
The report states the cost of maintenance for the horse-drawn truck must be made up largely from the cost of the maintenance of the three horses, no account being taken of the additional cost that would result from the sickness or death of a horse, which of course would necessitate a replacement, but on the other hand, the event might not happen during one month. Consequently the maintenance cost is made up from the amount of hay, oats, straw, etc., consumed by the horses each month, together with the cost of veterinary services, shoeing and similar expenses. To this also must be added the cost of stable repairs, minor repairs on apparatus, and minor sundry expenses incurred by both horses and apparatus.

These points were duly considered, and the entire amount for 1 month was estimated at $58. This makes the cost per day $1.90.

Against this the cost of the maintenance of the electric truck was placed. The heaviest maintenance charge was found to be the cost of charging with electricity, this item amounting to $3.71 per month. The repairs expenses were very slight, being limited chiefly to broken battery jars, the item amounting to a monthly average of $0.74 per month. Thus, the total maintenance cost amounted to $4.25 per month. Subtracting this amount from the $58 necessary to maintain the horse-drawn truck leaves a balance of $53.75 per month which is saved by the use of the motor apparatus.

These results are most interesting. In each case cost was most carefully kept and a true average was estimated.

In consequence of the remarkable saving and greatly increased efficiency shown by the motor vehicle, the chief engi-



Seagrave Combination Ladder and Chemical Wagon in Use in the Richmond, Va., Fire Department

Battle Creek Fire Automobile Overcoming Snow Difficulties

neer of the Springfield fire department recommended the purchase of 4 motor-driven combination hose and chemical cars and 2 motor-driven hook and ladder trucks.

The car used by Squad A of this city is a most satisfactory piece of apparatus and does excellent work, being fitted with all the latest life-saving devices, including pumping nets, scaling ladders, life belts, life gun, ozone generator, stretcher, first aid kit, smoke helmet, extension and roof ladders and 18 other different types of tools, including a quick hitch to tow disabled apparatus, either motor-drawn or horse-drawn.

There is another feature of interest in the Springfield report. The boilers in some of the steam-fire engines were condemned and an order was given to replace the worn-out boilers by new ones. Before passing this order through, however, it occurred to the department that the time had arrived for a consideration of the value and utility of the motor fire engine, of which there are several designs on the market. Although it was considered that the motor fire engine had not yet attained the efficiency of the steam fire engine, nevertheless it was recollected that a large number of very clever mechanics were working towards the perfection of this piece of apparatus, and that it was quite possible that within a very short time the motor fire engine would reach the development of the steam fire engine. The matter of cost was also considered. The cost of overhauling an old engine and fitting it with new boilers was estimated at $2,000 approximately. The wages of the driver and of the stoker, both of which are necessary on a steam fire engine, would amount to about $2,200 per year, while the cost of maintaining the horses would reach the figure of $500 per year. The total cost for the steam fire engine would thus amount to $4,700 per year.

Big Motor Fire Engines Instead of New Boilers

The motor fire engine would not require a new boiler nor horses, thus eliminating the two amounts of $2,000 and $500; neither would the car require a driver or stoker, the latter not being needed, while the driver's place would be taken by the engineer, who would serve in both capacities. Thus, the $2,200 per year could be taken off the cost sheet. It can be seen, therefore, that by the purchase of a motor fire engine, instead of having new boilers put in the steam engine, a yearly saving would be made of $4,700. This amount, put by, would amount in 3 years to the sum spent for the purchase of the motor fire engine. It remains to be seen, however, whether the motor fire engine will eventually oust the steam fire engine. As yet apparatus that has been tested does not in all points appear to have been satisfactory; weak spots, however, have been discovered and these will naturally receive the closest attention of experts.

The great difference between the annual cost of motor-driven and horse-drawn fire apparatus is shown by the following figures relative to the apparatus used by the fire department of the city of Lynn, Massachusetts. The cost of operating a Pope-Hartford fire automobile for 8 months, during which period it answered 275 alarms and traveled 369 miles, was as follows:

Gasoline and oil	$11.47
Tire repairs	30.50
Tire chains	6.50
Miscellaneous	15.77
	64.24

In addition, the Lynn fire department has a Knox automobile combination wagon. During the year, this apparatus answered 181 alarms and traveled 527 miles, the cost of operating amounting to the following:

Gasoline and oil	$25.64
Prest-O-Lite	2.75
Auto soap	.80
Graphite	20
Automatic light switch	5.56
	$40.67

The figures for the horse-drawn apparatus for the year were as follows:

Hay	$165.32
Straw	15.37
Oats and shorts	126.47
Shoeing	37.39
Repairs to stalls	14.90
Miscellaneous	5.28
	$364.93

In addition to this the exercise wagon was repaired and painted at a cost of $40.70, making a total cost of $405.63.

The recommendation of the chief engineer of the fire department of Minneapolis is that as soon as possible all horse-drawn apparatus should be changed to motor-propelled apparatus, this step adding to the efficiency of the department and reducing operating expenses.

Reproduced below is an interesting table of expenses incurred during the year by an automobile in the service of the department:

Tires	$325.93
Gasoline	227.36
Charging battery	2.30
Lubricating battery	20.00
Wood alcohol	1.00
Repairs	48.00
Plate glass	5.90
Chains	7.05
Auto tag	1.50
Crescent burner	.50
Pipe	1.50
Recharging Presto tank	2.00
Electric globes	8.55
Spark plugs	3.00
Tire protectors	41.20
Fibre pinion	.50
Total	$749.58

The report of the shoeing department includes some good figures, showing what a big cost item this is in a fire department, an item that may be entirely removed by the adoption of motor-drawn apparatus. Below is a summary of the work done during the year:

New shoes	$1,305
Reset	2,853
Rubber pads	901
Leather pads	122
Total operations amounted to a sum of	$2,461.50

Stock for this department was also purchased amounting to a sum of $901.64.

An interesting display of the high efficiency of motor fire apparatus occurred recently at Springfield, Ohio. A motor fire truck was loaned by the Kelly Motor Truck Co. to the fire department, and the first use to which it was put was to extinguish a fire which broke out at the home of the owner, E. S. Kelly. The run to the house was made in 14 minutes, this distance being 10½ miles. The firemen thus had a fire-rate opportunity of seeing the apparatus actually at work.

Improved conditions are the result of the adoption of motor-drawn fire vehicles by the Decatur, Ill., fire department. The latest report issued by the department gives an account of the work done by the automobile combination hose and chemical truck for a period of 153 days. During this time the weather and road conditions were very trying, yet the service was at all times strictly up to every requirement. The motor apparatus answered 67 alarms, and traveled 1,242 blocks. The cost for supplies and repairs during this time amounted to $33.60, or a little less than 22 cents per day, these figures showing a considerable saving over horse-drawn vehicles under similar conditions. The motor-driven vehicle has shown that it can travel to the scene of a fire in much less time than a horse-drawn engine, and when it arrives all the men are immediately ready to fight the flames, there being no need of attention to the means of locomotion, and no looking around for some one to hold the horses.

Motor Apparatus Extends Districts

Another advantage obtained by the purchase of the motor-driven engine was the ability to dispense with the use of a building, and the sale of 7 head of horses and one wagon for the sum of $1,750.00.

The purchase of an additional automobile combination chemical and hose truck is recommended.

The chief of the Lexington, Ky., fire department considers from his own personal experience that motor-driven apparatus maintenance does not cost over one-third the cost of horse-drawn apparatus.

Another staunch supporter of motor fire apparatus is the chief of the fire department of Manchester, N. H. In his annual report he intimated to the municipal authorities that all progressive cities were installing motor-driven fire apparatus, and unqualifiedly recommended the purchase of another automobile combination chemical and hose wagon, one already being in use. The ability of the latter piece of apparatus to "get there quick" had been fully demonstrated in the fifteen months during which it had been in use. The chief also recommended the purchase of an automobile for the use of the chief engineer, and the purchase of a chassis upon which may be constructed a body suitable for fire-alarm work, and also used as an emergency wagon in case of brush fires, for carrying coal in case of large fires and for general use in the department. He likewise made mention of the fact that the council should soon be considering the changing of heavier apparatus from horse-drawn to motor-driven machines by use of tractors, some of which are already on the market and are quickly coming to the front.

The following figures showing all expenses incidental to the purchase and upkeep of the motor vehicle are interesting:

Automobile combination wagon	$5,500.00
600 feet fabric hose	270.00
Firemen's fire-suits and badges	80.00
2 extra rubber tires	200.00
Beds, bedding and furniture	250.00
	$6,300.00

The above opinions with regard to motor-driven apparatus seems to be fairly general among fire engineers in all parts of the country. The one great truth that has been formulated with regard to such apparatus is that it is in *all respects* more efficient and cheaper than horse-drawn apparatus. It will be interesting to note the opinions that will be voiced at the forthcoming International Association of Fire Engineers on this subject.

The Advantages of Motor-Driven Apparatus

The chief engineer of the Duluth, Minn., fire department emphasizes the advantages of the motor-driven apparatus over the horse-drawn in a clear and concise manner. He recommends that more motor apparatus should be purchased, thereby doing away with a great many of the new engine houses that are being advocated for in the city. He says that even the most skeptical must be convinced of the superior practicability of motor apparatus from the service that has been rendered by the motor rigs now in service. The very efficient service that has been given by them in deep snow and extremely cold weather has demonstrated beyond any chance of argument that the motor rig will, can and does, do that which it is contended it can do. It increases the efficiency of the department by its arrival at a fire in less than half the time taken by horse apparatus; it decreases the cost of the department, as when it is not working there is absolutely no expense; it takes men and equipment to fires on steep hills in three-fourths less time than the horses, and when they arrive they are in a fit condition to work, whereas with the men on the horse-drawn rigs it is necessary for them to walk up steep hills for the major part of the distance, as the horses have all they can do to pull up the wagon and the equipment; therefore, when the men arrive they are out of breath from the exertion and in no condition to render efficient service in the smoke of a building; the territory of effective service is enlarged by one-half or even more than this.

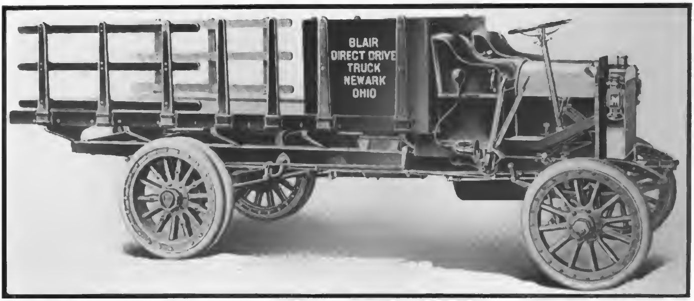
By using a motor fire apparatus a fire department can save practically $2 each day in cost of upkeep. This represents actual cash alone and does not account for the vast increase in utility and for the fact that very often by the instalment of fire apparatus a municipal department can dispense with an extra fire station. It might almost be said that by a complete motorization of a fire department a municipal government could lessen by half the number of fire substations.

These arguments are unanswerable by the most fervid antagonist of motor locomotion. They form the synthesis of actual results.

Get Rid of Horse at Once

There is one point that should be remembered by fire departments who recognize the immense superiority of motor-driven over horse-drawn fire apparatus, namely, the fact that each year it becomes more difficult to dispose of horse-drawn apparatus at a reasonable figure. The eventual motorization of the fire department is the one aim of practically every far-seeing fire engineer in this country, and each one is chary of buying horse-drawn apparatus. It is advisable, therefore, that the men who have the clearness of vision to see into the future of fire departments, unhampered by conservative actualities, should at once take advantage of those who, less wise, refuse to recognize that a new age has dawned in traction and transportation and that the hours of the horse are numbered. Otherwise, not even a nominal price will be obtained, and horse-drawn apparatus will swell the somewhat unprofitable junk heap.

Motor Fire Apparatus at Battle Creek, Mich.



New Worm-Driven Truck from the Blair Mfg. Co., Newark, Ohio

Three Blair Trucks

New Line of Worm-Driven Truck Models of Same Design, But Different Capacity

THE Blair Mfg. Co., Newark, Ohio, has a line of three worm-driven truck models of 1.5, 2.5 and 3.5-ton capacity, the last-named model being the most recent addition to the line. The design of all three models is alike and incorporates a four-cylinder, L-type motor located centrally in front so that the driver sits at the right side of it and the passenger at the left side. The motor delivers its power through a cone flywheel clutch with cork inserts to a three-speed selective, individual-clutch gearbox and thence by propeller shaft to the worm-driven rear axle. A feature of the entire design is carrying the motor and gearbox on a lag subframe which in front hinges to the main frame through steel castings in heavy hardened and ground steel hinge pins, and at the rear is hinged direct to the rear axle to permit of a right or left rotation. The rear end of the subframe has its hinge or trunnion support in front of and in rear of the axle housing and on the short worm shaft. By this suspension either rear wheel can rise over obstructions and yet leave the subframe free of strains that might be transmitted to the motor, clutch or gearbox and so disturb the desired alignment of these and the rear axle.

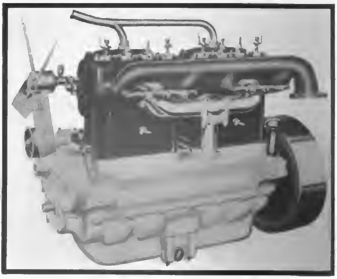
The speeds at which these three lines of trucks operate depend largely on local conditions, whether level, as in Chicago, or hilly, like Pittsburgh, Kansas City or Cincinnati. All are fitted with motor governors which regulate to 10 miles per hour on the 3.5-ton one, 12 miles per hour on the 2.5-ton model and 14 miles per hour on the 1.5-ton style. The chassis prices are $3,000, $3,250 and $3,750 for the three sizes. Two motor sizes are used on the three models. On the 1.5-ton the motor is a four-cylinder monoblock design 4⅛ and 5¼ inches bore and stroke; and on the 2.5 and 3.5-ton sizes the power plant is a twin casting, one with four cylinders 4.5 by 5.5 inches bore and stroke.

The 1.5-ton chassis has an over-all length of 180.5 inches on a 114-inch wheelbase. Of this over-all length 115 inches is in load carrying platform, so positioned to give slightly over one-third overhang back of the axle. The over-all width is 72 inches. Solid tires are used all around, 34 by 4-inch singles in front and 34 by 3-inch duals in rear. The weights are, empty, front, 2045 pounds; rear, 2775 pounds; loaded, front, 2465, and rear, 5355. The 2.5 ton and 3.5 ton models use the same chassis dimensions, namely, 187.5 inches over-all length and 121-inch wheelbase. The body space measures 122 inches in length, or 1 inch more than the wheelbase. The over-all width of each is 72 inches, the same as in the 1.5-ton model. The weights of the 2.5 tonner are: front wheels, empty, 2190 pounds; rear wheels, empty, 2870 pounds, and loaded, front, 2705, and rear, 7285 pounds. The trucks will turn in a circle 47 feet in diameter.

The motors are of the L-head type with enclosed valves. The magneto is located on the right of the motor and the carburetor on the left. The latter is of special design. A Bosch dual magneto with fixed advance system of ignition is used. The oiling system is entirely automatic, one filling being sufficient for 500 miles.

The gearset is the same in all models, of the selective type, with three forward speeds. The clutch is of the cone type with cork inserts. The gearbox is placed amidships between the flywheel and the rear axle. The rear axles are floating types, the front axles drop forgings.

The brakes are all of the contracting type.



Motor on New Blair Truck

The Stewart Vehicle

The First Machine to Be Marketed By Stewart Motor Corporation is a 1500-lb. Vehicle

A 1500-pound vehicle fitted with six styles of bodies and designed to travel at a speed up to 30 miles an hour is the opening announcement of the new Stewart Motor Corporation, Buffalo, N. Y., which was recently organized by T. R. Lippard and R. C. Stewart, former manufacturers of the Lippard-Stewart delivery wagon.

The vehicles, to be known as Stewarts, are conventional types with the 4-cylinder motor carried under a Renault hood with the radiator in rear of the motor and constituting the dash. Right-hand control is fitted and the load carrying platform located entirely in rear of the driver's seat has considerable overhang back of the rear axle. In spite of this design the delivery wagon has an over-all length of 174 inches on a 126-inch wheel base. It regularly carries pneumatic tires all around, 34 by 4-inch sizes in front and 35 by 4.5-inch sizes in rear. When empty the vehicle weighs 2900 pounds, said to be equally supported over the front and rear axles, but with its 1500-pound load on the total weight over the rear wheels is 2450 pounds and 1950 over the front wheels. It uses a standard 56-inch tread.

The Stewart delivery wagon is suitably designed for its line of work, conforming as it does to loading platform and general street and alley conditions. From the load carrying platform to the ground measures 32 inches without load and 29.5 inches loaded. On all body types the load carrying space is 84 inches long and ranges in width from 44 to 60 inches, one-third of the 84-inch length being overhung back of the rear axle. The truck can be turned in a circle 35 feet in diameter. In a side view of the vehicle the back of the seat is practically the middle line, in that it is 7 feet from this point to the front of the wagon and 7.6 inches to the rear. The forward speeds are 9 miles per hour on low, 17 miles per hour on second speed and 30 miles per hour on direct.

The power plant is of the Continental make and rated at 30 horsepower; it is a four-cylinder, four-cycle block casting of the L-head type. The cylinders have 3¾ inches bore and 5¼ inches stroke and are machined to a mirror finish. All the valves are on the left side, are of ample size and well cooled; their heads are of nickel-steel and electrically welded to the stems of carbon-steel.

The motor pistons are ground to an exact fit and formed with five oil grooves around their outer walls, which insure copious lubrication. Each piston is 5 inches long and carries four eccentric rings. The I-beam, drop-forged connecting rods are 10½ inches long and equipped with 2½-inch bearings; wear of the latter is taken up by the removal of punched steel shims.

Great strength of the crankshaft is insured by the use of 0.40 carbon steel, which gives the drop-forged, heat-treated shaft a tensile strength of 90,000 pounds per square inch.

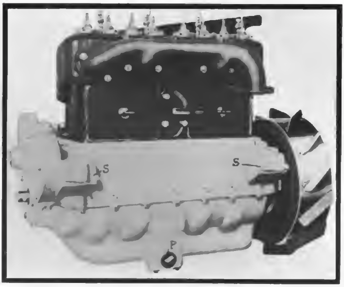
A float feed type of carburetor is used with the gravity system of supplying gasoline. The carburetor is of special design for commercial work.

A high-tension magneto with fixed spark and a double set of spark plugs constitute the ignition system.

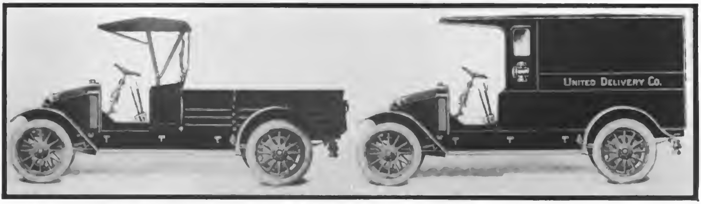
Positive lubrication is insured by the use of two plunger pumps, which are actuated by an eccentric from the camshaft and by a splash system which lubricates the wristpin and pistons.

Cooling is by means of a large centrifugal pump driven by helical gearing from the crankshaft. The water jacket-heads, from which the hot water flows to the radiator, are cast separately from the cylinders so as to be easily removable. The radiator is of the flat-tube type and installed behind the motor, which, together with the hood sloping down in front, gives the vehicle the appearance of a Renault front.

A universal joint couples the motor unit to the clutch, which in turn forms a unit with the three-speed-and-reverse selective gearset. The clutch consists of six steel and five Raybestos disks. The speed-change gears and shafts are of 3½ per cent. nickel steel and heat-treated. The shafts run on Timken roller bearings and are fitted with stuffing boxes to prevent the leaking of grease. The gearbox is a nickel-aluminum casting, and the control levers are directly placed over it, being in a central position on the driver's seat.



Left Side of Stewart Motor



Stewart Delivery Cars, with Open Box Body and with Panel Body—Both 1500-Lbs. Capacity

Developments in Construction of Front

Atterbury Steering Knuckle Design

Walter Springs and Steering Gear

Types Now in Use

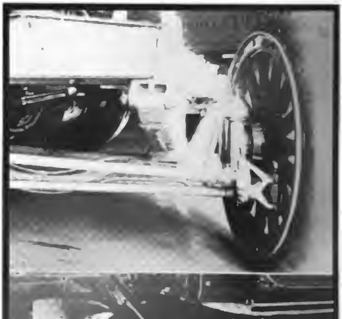
What Will the Ultimate Standard Types Be? Continuous Axles, Semi-Elliptical Springs, and Steering Pivots of the Ackermann Type Predominate

IT is difficult to predict just what the ultimate standard type of front axle will be from the indications and conditions of the 1912 commercial vehicle season. In point of numbers the square or rectangular section solid axle is slightly in the lead, with the I-beam type a close second, the circular section, tubular or solid, next, and but one specimen of the channel section axle on the market. On the other hand, as regards 1911 construction the I-beam party has suffered but slight diminution in numbers, while the square or rectangular section has increased its forces in all capacities of vehicles. The tubular axle has practically done no more than held its ground, while the round wood axle is very rare.

Semi-Elliptic for Front Suspension Probably Standard

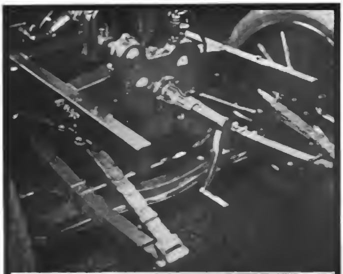
In the matter of spring form, the semi-elliptical type is predominant, with the elliptic second and the transverse and three-quarter elliptic types represented only by small numbers. The semi-elliptic for front suspension is probably the standard type of the future for all but very light delivery types, but the more general use of the two-cycle motor in such vehicles may give rise to the transverse types if present indications are a guide. In springing and axle form and fitting a general practice is noticeable, but the variants are numerous and well worthy of serious consideration for the most part as factors in arriving at ultimate types.

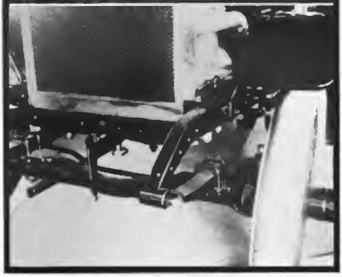
In the I-beam axle the form variations are considerable. In a number of the lighter vehicles the axle is straight, the body and power plant being carried sufficiently high under working



Universal Axle Steering Gear and Spring
Gramm Axle and Steering Gear Arrangements

nd Rear Axles and Springs—Part II.





Lippard-Stewart Full-Elliptic Spring

Atterbury Front Spring Design

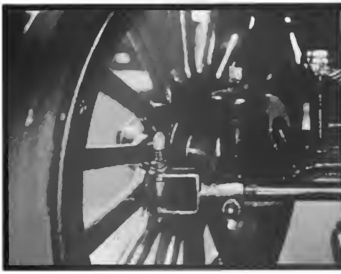
conditions to eliminate bottoming on the axle. On heavier vehicles a curve or drop is formed at the center to prevent this bottoming, but there appears to be no uniformity in this, as is the case also with the majority of axles of other than I-beam section. Examples of this variation in drop are seen on the Morgan, Universal and Atterbury trucks among others.

Continuous axles, with the steering yokes integral and spring pads formed by widening the upper flange at the proper points, predominate, but there are a number of axles in service where the center portion is of solid square or rectangular section and the remainder of I-beam section, as in the Knox construction. In the example mentioned the spring pads are notched to take the spring-carrying yokes, differing from practice as exemplified by the Morgan, Victor and Universal trucks, in having the pads drilled to take the threaded ends of the yokes in question. The channeling is for the most part continued to the swell which forms the upper and lower portions of the yoke. In the Victor truck, on the other hand, the elbows are left solid for strength at these points without increase in the size of the forgings.

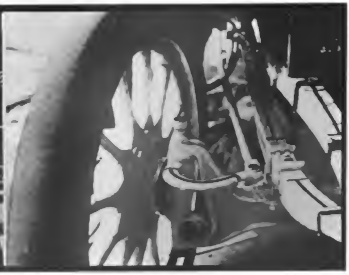
Square or Rectangular Section Axle

Next in order comes the square or rectangular-section axle, found chiefly on the light and medium delivery wagons, and on the Walter truck as a typical instance in the heavy class. In this form of axle a one-piece construction is used and the pads are drilled for the spring yokes as in the case of the I-beam axle construction. On the Walter vehicles the steering ends are bent upward, while on the Lozier, another example, the axle bottom is straight below the spring pads and the lower sides of the bottom steering yokes are flush with this bottom. It is noticeable that in the axles of both this and the I-beam sections large factors of safety in axle construction are the order of the day and that the present-day commercial vehicle is even better adapted to operate over all kinds of roads than even that of 1911.

Axles of circular cross-section have their staunch advocates, the lighter wagons and trucks having tubular front axles, while the solid round axle in the heavy weights is demonstrated by a few products. General construction in both cases has the forged axle-ends welded on so that the wheel center is slightly above the axle center, or concentric where the clearance of the vehicle is considerable. The use

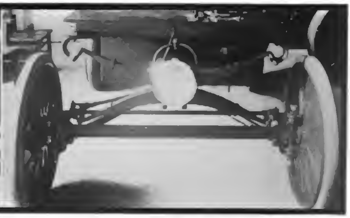


Victor Steerng Gear Construction



Front Spring on Buick Commercial Vehicle

Semi-Elliptic Front Spring Design



Front Springs on Walker Electric

of circular-section axles cannot be said to have increased to any great extent since the previous season, the majority of users having adhered to this form since their adoption of the same or the placing of their product on the market.

On the Detroit light delivery wagon an exception to the general practice in tubular-axle construction lies in the form and location of the forged axle ends. These are harp-shaped, the axle fitting into sockets in the lower portion, while the yoke top and bottoms are small and the peaks carry the ends of strut-rods and the outer a pair of shackles for the transverse front spring. In the truck constructions the yoke and spring pad are formed on the forged end, and in the Commer lugs for the reception of the spring retaining bolts are also forged integral and afterwards drilled. This construction involves the use of different lengths of spring-retaining bolts for the outer and inner side of the spring and a top-plate instead of a spring-carrying yoke.

Steering pivots are in the great majority of cases of the Ackermann type, in which the yoke is part of the axle and the pivot works within the jaws of the yoke and carries the wheel. The center of the pivot is usually a prolongation of the center of the yoke, but in the heavier trucks the upper arm of the yoke is prolonged, as in the Gramm, and the spindle is carried low. On the Buick the pivot is also long, but the wheel is carried high and the center of gravity of the vehicle lowered for the size of the wheels. In these, as in all steering-end construction, oil or grease cups are fitted at the top of the yoke for pivot lubrication.

Reversed Ackermann Pivot Construction

The reversed Ackermann pivot construction has found favor, and one of its advocates is the Pierce. In this construction the yoke is formed integrally with the pivot and the axle carries a stub on which the yoke turns. A through pin ties the stub and pivot together. The pivot and yoke are integral, following general practice in this respect. On the other hand, a caster effect in steering is provided for by mounting the wheel spindle in rear of the pivot center line, where the spindle is separate from the pivot itself.

As regards drag links, they are for the most part placed in front of the axle on the heavy trucks, and in about equal numbers in front of or in rear of the axle on the lighter wagons and trucks. The arms from the pivots are usually inserted into sockets formed in the latter, and with stub ends over which fit the yokes at the ends of the drag links. The steering arm is occasionally a separate piece, but where the motor is in the under-seat position it forms an integral part of the left-hand pivot arm. Examples of this form of construction involving front position of the drag link are the Universal, Morgan, Gramm and Victor trucks. On the Atterbury the steering arm is fastened to the drag link near the right pivot arm, while on the Buick the arm curves from front to rear and is integral with the pivot. In this latter machine the link is behind the axle. Like the pivots, the drag link bearings and joints are lubricated by cups and also by boots filled with grease in a number of instances.

The semi-elliptic spring is predominant, but the elliptic and transverse semi-elliptic are well represented. In the fitting of the first type the front end is attached to a dumiron forming part of the frame side member, while the shackle is placed at the rear where it attaches to a hanger below the frame. An exception to this general arrangement is seen on the Cass, where the rear end of the spring slides in a special bracket, and on the Gramm where a similar bracket is employed, but the horizontal movement of the spring end is limited by stops at each end.

Büssing Double Suspension Type of Springs

A double suspension type of springing is found on the Büssing, where auxiliary coil springs are fitted at each end of the regular semi-elliptic springs. The ends and the coil springs are fitted into boxes which limit the play of the latter to vertical movement, and in the rear allow of considerable horizontal motion of the rear end of the semi-elliptic springs. The springs are generally carried under the side members of the frame, but on the Gramm and Cass they are carried outside of the frame. The use of spring-retaining yokes is general for attaching the springs to the axle, with the exceptions noted.

Elliptic springs are mostly fitted to the lighter vehicles and are located under the side members of the frame. Unlike pleasure car practice, the ends are attached directly to each other and no shackle is interposed. On the Lippard-Stewart the upper portion of the spring is clipped to a pad on the under side of the frame side member, while on the Buick it is fitted alongside this member. The transverse semi-elliptic front spring is fitted reversed as on the Detroit light wagon, the butt being clipped to the under side of the front cross-member and the ends attaching to shackles fitted to the steering yoke forging. On the wagon mentioned, a double shackle construction is fitted at each end, and the axle is kept in perpendicularity to the frame by strut-rods at each end, leading to the side members. On the Walker electric wagon the well-known Jeantaud arrangement of springing is used, this consisting of two transverse semi-elliptic springs placed back to back and clipped together, their ends being shackled respectively to the horns on the axle ends and to curved hangers on the side members of the frame.

Relatively Small Cup of Semi-Elliptics

A most noticeable point as compared with spring construction of previous seasons is the relatively small cup of the majority of semi-elliptic springs. Former constructions showed springs of all kinds with considerable curvature, and this was carried to an extreme in one case of elliptic springing in a preceding season by a ratio of 3 to 4 between cup and length. The general tendency is to have the ratio less than 1 to 5 on semi-elliptics and about double that for the elliptics. Nevertheless, the advocates of the deep spring adhere to their practice of past seasons, and among these may be mentioned Hewitt, who employs the semi-elliptic with deep cup on his trucks from 3½ to 10 tons capacity. Examples of relatively flat semi-elliptics are those on the Büssing, White and Gramm trucks, and on the elliptics of the Dart light delivery wagon.

In connection with the front springing of a truck, the shocks which the motor and remainder of the power plant are subjected may be reduced by the employment of spring suspension of the motor, and the idea thus stated is worthy of much more consideration than has been given it to date. The usual means of isolating the power plant is by mounting it on a false frame, which in its turn is mounted on the main frame, or by a unit system of construction with three-point suspension. Examples of motor spring suspension are on the Lozier and Stearns. The arrangement on the Lozier is as follows: Two feet are attached to the front cross-member. On each side is a single foot at the end of a curved arm which fastens to the butt of a reversed semi-elliptic whose ends slide in brackets inside the channel of the side members. A single leaf clipped to the arm attends to the rebound. The motor is thus isolated from shocks by resting in the spring cradle so formed. The front feet limit the downward motion of the motor and cradle and the single leaf on each side the upward motion beyond a certain point.

I-Beam Axles for Electrics

In the electric field the I-beam axle seems to be the most favored, not only on the heavier trucks but on the very light ones also. Next in point of numbers comes the circular-section axle, as a tubular construction on the lighter wagons, and as a solid round on heavy weights, such as the General vehicles. In springing, the semi-elliptic is in the majority with platform and three-quarter elliptics fairly well represented. The elliptic spring is conspicuous by its absence. The exception to the general practice is the Walker, fitted with I-beam axle and drag link behind the axle.

Wheels are of wood, with the exceptions of the Büssing, Smith, Gaggenau, White and Locomobile, fitted with steel wheels, Morgan with iron wheels and Walker with disk steel wheels. For light vehicles and trucks the spokes are for the most part of oval or circular cross-section, resembling those of a pleasure car, but naturally strengthened for the heavier service. On the heavier trucks the spokes are rectangular in section but tapered in most cases from the nave toward the felloe. In this form of construction European practice in heavy truck wheels is followed, as in the cases of the Ariés, Speedwell, Hewitt, Peerless and Knickerbocker. On the first mentioned, steel tires are used; on the remainder, solid rubber tires. The use of solid tires on the 800 to 1000-pound vehicles has given rise to the use of the two-cycle motor, the argument being that this form of motor is not easily affected by vibration from the use of solid tires. The springing on such vehicles is nearly semi-elliptic, the Detroit wagon, for example, having a transverse spring with double shackling at the axle ends. On the lighter cars, tires are either pneumatic or solid, the former for city service and the latter for general out-of-town use.

Death of the President of the S. A. E.

HENRY F. DONALDSON, a well-known and familiar figure in the automobile world and president of the Society of Automobile Engineers, died suddenly on Tuesday, August 13, at his home at 508 West 149th Street, New York. Mr. Donaldson had been connected with the automobile industry for ten years and was one of the founders of *The Commercial Vehicle*, he being one of the first to recognize the immense future before the motor truck. He was also editor of *The Automobile* for several years, and was an authority on automobile technical work.

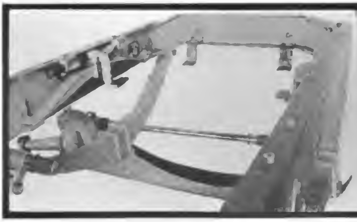
Mr. Donaldson was of Irish-Scotch descent, and passed many years of his early life in Glasgow, taking the classical course and that of marine engineering in the University of that city. He was first employed in a Glasgow shipyard where his knowledge and broad sympathies quickly brought him to an authoritative position. Seeking health in the United States, he became a reporter in Chicago, and was on the local staff of the Chicago *Times*. From Chicago, he came to New York, where he was connected with the New York *Times*. While here, he founded *Marine Engineering*, the leading publication devoted to the subject in the world. About 1900 he sold his interest in this paper and was subsequently appointed editor of *The Automobile*. He was one of the founders of *The Commercial Vehicle*, but later sold his interest in the paper and became a consulting automobile engineer in partnership with Joseph Tracy.

His wholeheartedness, activity, wide sympathies, and never-failing courtesy, gained for him a great number of intimate friends and companions, to whom his sudden and totally unexpected death has come as a great blow.

The Council of the Society of Automobile Engineers has passed the following resolutions on the death of President Henry F. Donaldson:

RESOLVED, that the Society of Automobile Engineers, through its Council, greatly deplores the death of its President, Mr. Henry F. Donaldson, whose capable and energetic work for the Society during the past year is widely recognized and who was respected and beloved by all of his associates for those brilliant attainments of mind and sterling qualities of manhood that raised him above the ordinary level of mankind, making him a natural leader and an unwavering advocate of that which was right and noble and generous; and be it further

RESOLVED, that the Society extends its deepest sympathy to his immediate family and other relatives in their grief over their great and irreparable loss.



Front Lozier 5-Ton Main and Sub-Frame Springs

Flat Spring Suspension on Morgan Truck

The Deep Alkali Land Wrapped Itself Around the Wheels of the Truck in Storm-Swept Wyoming; the Truck Was Often Up to Its Hubs in Bottomless Clay

Cross-Continent Trip

Alco Truck Has Now Reached Idaho and Has 800 Miles to Travel Before It Reaches Petaluma, Cal.

KELTON, Utah, July 25.—Special Telegram.—By a wide detour Young's transcontinental Alco truck passed the Utah-Idaho State line just north of Snowville—thirteen State lines crossed since the start from Philadelphia. The mileage figures were booked to 3,154 miles. Most of the day's run by way of Bingham was through well-cultivated sections, two steep canyons also being traveled. The temperature hovered in the eighties.

AS the transcontinental Alco truck crossed the border into Wyoming it was prepared to meet worse conditions than even those that had been already encountered. The raw prairie soil of Wyoming was made almost impassable by heavy rains. In 8 days there were 10 cloudbursts, and only general records were kept, as all time had to be given to working the truck. On July 29 the truck started towards Medicine Bow, having been running for 30 days, passing through 11 states and accomplishing a mileage of 2,550. At one time the truck climbed 5,140 feet in a distance of 50 miles, and then descended 1800 feet into the plains, where it was caught in a torrential rain storm. The trail became nothing better than a sea of mud. Seventy miles of roads ahead were transformed into rivers. All through Wyoming the truck was in deep ruts and high centers, and the tracks were often too narrow for the truck to enter, thus necessitating a detour. Between Denver and Fort Collins the truck made the best speed since crossing the Mississippi.

Average Mileage, 80.2 per Day

Even touring cars had abandoned the roads leading to Medicine Bow, and no human being was passed for 2 days. The average mileage on July 31 was 80.2 miles per day, taking into account the many hours spent on testing and replanking bridges. No fewer than 200 were inspected in 3 days. One day 8 hours were consumed in this work. The trail consisted of two ruts, 4 inches wide and 56 inches apart. Careful, slow driving was necessary.

Hanna, Wyo., was reached on August 2. Conditions, so said the local inhabitants, had been unequaled for 14 years. Every inch of the road had been transformed into bottomless clay, and the whole way the Alco had to cut its way in most treacherous ground. For 2 days the truck was delayed at Hanna on account of washed away bridges. The country to the west of this place was under 2 feet of water and at one place a mile of railway had been submerged. The total mileage amounted to 2667 miles. To Wamsutter the road lay over country that was a succession of deep dips and sharp rises. The truck drove across many gullies so abruptly that the front tires would rest on the upper banks and the rear tires on the lower banks, 4 feet below. No halt was called, however, and Wamsutter, Wyo., was reached on August 6.

Caught In a Terrific Thunderstorm

From Wamsutter onwards it was announced that there would be great difficulty in finding facilities for telegraphing, as it would be impossible to reach a telegraph office every night.

On August 9, at Point of Rocks, Wyo., a terrific thunderstorm caught the truck, 4 coast-to-coast touring parties and 2 prairie schooner outfits on a 7000-foot plateau. All newly made trails were obliterated, and the whole party had to hang up. Huge chunks of clay wrapped themselves around the wheels and rendered progress absolutely impossible.

The latest news on August 10 was that the truck was on its way towards Evanston, Wyo., where it would take a trail

The Trail of the Truck After the Heavy Rain—10 Cloudbursts Took Place in 8 Days

Captain Ferguson, the Chief of the Alco Crew, Typing Out His Daily Report

leading to Salt Lake City, and from thence the route would lead to Reno, San Francisco and Petaluma, Cal. Announcement was also made that as soon as the cargo had been delivered another load would be taken and hauled over land to Los Angeles, adding 500 miles to the journey of 4000, as the Los Angeles business men took a great interest in the progress of the truck.

Rock Springs, Wyo., was entered on August 11, after a battle with conditions that successfully stopped three transcontinental touring cars. On an overflowed alkali flat the crew had been forced to spend a day building a dam to hold back the water prior to the construction of a temporary causeway. The mileage covered up to this point amounted to 2803.

Wide Detours Necessitated by Rivers Overflowing

On August 16 the Alco truck rescued a touring car by pulling it through a bottomless alkali flat. At Evanston the party arrived with a stranded motor cyclist who was found in an isolated part of the country. Overflowing rivers on the direct road compelled the truck to make a wide detour to the north and west and then a return to the south. On August 15 and 16 rains were very heavy and destroyed many miles of road. The total mileage when the truck reached Evanston amounted to 2943.

Canyon conditions past this point were dangerous. Touring cars westward bound abandoned their journey owing to the danger of skidding off the narrow, sharply winding roads and rolling over the high cliffs. There were three canyon conditions such as this to traverse, and the perils were rendered greater than usual on account of the treacherous conditions engendered by the heavy rains.

On August 19, with a mileage of 2996 to its credit, the truck, after three bad washouts in the course of the day's run, reached Echo, Utah. A snowstorm across the last part of Wyoming was a novel weather condition heretofore not encountered.

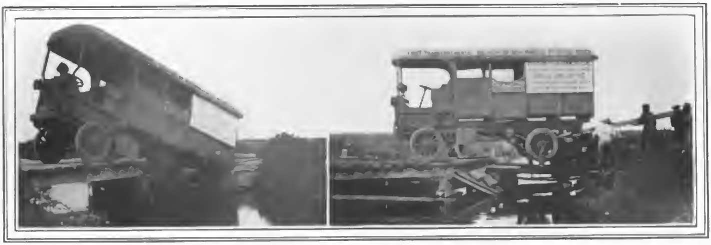
Over two summits, through two canyons and along cliff side roads that were only 6 inches wider than the tread of the truck, the Alco reached Salt Lake City on August 20. The crew enjoyed a fine journey through valley and mountain scenery, and only several weak bridges had to be replanked. As soon as the truck reached the city a party of Nevada mining and smelter men, intending to buy motor trucks for freighting from their mines to railroad shipping points, requested that the truck should remain in the city for a day so that they might have a chance of inspecting it after its long run of 3026 miles.

Demonstrations Before Utah Business Men

Ogden, Utah, was reached on August 22, after several detours had been rendered necessary by the request for demonstrations. In this part of the country a great deal of interest was shown in the truck, as heavy vehicles such as the Alco truck are needed in this district.

Before delivering its cargo at the silk mills of the Carlson Currier Co., at Petaluma, Cal., the truck has about 700 more miles to travel.

The Truck Traversing the Trackless Plains of Wyoming



This Bridge, Near Sterling, Colo., had been Inspected by the Alco Crew, But Proved to Have Been Burned In Parts; with the Aid of a Stout Beam, However, the Truck Was Successfully Lifted Out

Commercial Car Questions Discussed

Preventing Fire in Garage

Editor, Commercial Vehicle—I am thinking of going into the garage business and would like to know how a garage should be ventilated in order to prevent the collection of dangerous gasoline vapors and any other precautions that should be taken to preclude all possibility of fire.—R. D. Turner, St. Louis.

As gasoline is heavier than air it collects at or near the floor and consequently all ventilation should be by means of openings in that vicinity, which should lead into air shafts having outlets through the roof. This system of ventilation will operate only to best advantage during fair weather as rainy or even damp weather will lessen the circulation of air through these shafts. Therefore, the surest method of carrying off all gasoline vapors is by means of a forced circulation of air through shafts similarly placed. A fan or steam coil may be used to force the air.

Care should be taken that all electric light connections are placed well above the floor as a spark from one of them might ignite any gasoline vapor floating in the air. Incandescent lights with keyless sockets should be used in the examination of the vehicle. The drivers of all vehicles should be compelled to extinguish the lights on their vehicles upon entering the garage building. If any of the drivers wish to test out an engine or adjust a carbureter he should be warned to do it outside of the garage, as a spark from the vibrator of the coil, from the timer, from the magneto or generator brushes or when there is a leaky exhaust gasket is apt to fire stray fumes of gasoline.

Signs, printed in large type, should be posted in conspicuous places forbididng smoking, and this rule should be strictly enforced. Good fire extinguishers should be located at frequent intervals about the walls.

Getting Less Power From Light Electric Truck

Editor, Commercial Vehicle—I have a light electric truck with which I have been having a little trouble lately. The vehicle has been in service several months and this is the first time I have had any trouble to amount to anything. I have had the batteries charged regularly, in fact they were charged only a short time ago, and are testing up to standard at the present time, consequently I am at a loss to account for the fact that I am getting less power than I should. The motors are all right, the wiring seems to be in good condition and there is nothing else to look over that I can think of, so I am depending on you to help me out. Can you tell me what it is that causes this loss of power?—Merchant, New York.

Have you examined the controller, the switches, the commutators or the brushes? Evidently not, judging from your letter. If you have not, it would be well to look to them, especially if they have not been touched for a year. It is quite possible that the fault may lie with one of them, as they are apt to become coated with grease or some other nonconductive substance, or become oxidized. They should be carefully cleaned with a piece of rough emery or sandpaper until the surfaces are bright and shiny. If this is done carefully and they are looked after more frequently in the future, you should have no more trouble.

An Electric Shock When Passing Over Tracks

Editor, Commercial Vehicle—I have been driving a two-ton electric truck for about two weeks and it has become a rather unpleasant experience lately. I perspire rather freely and as a result, whenever I hit a bump or cross any tracks I get a shock, more or less severe, if I have my hands on any metal surfaces. Can you inform me what causes this shock and how I can remedy it?—Driver, New York.

Evidently you have a short circuit somewhere about the vehicle. Go over the wiring carefully to see that the insulation is intact. Special attention should be given to points in the wiring where they rub against the frame or some metal contact. Occasionally the insulation is rubbed off the wire by friction and if it strikes against a metal point it will cause a short circuit. No doubt if you follow this plan with care, you will discover the trouble, which can be remedied by winding a piece of tire tape around the exposed place on the wire.

Timing the Valves When the Engine Is Running

Editor, Commercial Vehicle—A friend of mine has told me that it is better to time the valves of my truck engine while the latter is running. Why is this the better plan?—R. T. Kirkland, Chicago.

The heat of the running motor expands the metal, especially the exhaust valve stem, thus affecting the timing of the valves. The expansion of the exhaust valve stem is great enough in some motors, to cause the valve to keep from closing tightly if the space is slight between the stem and the valve lifter when the motor is cold and the valve is closed. The effect is not so noticeable in other motors.

The valve is brought nearer to the valve-lifter when it is ground. After grinding a valve it and the lifter should be examined to see that the space between them is as great as it should be.

Repairing a Cracked Water Jacket

Editor, Commercial Vehicle—What is the best method of repairing a cracked water jacket?—Amateur, Boston, Mass.

There are various ways of repairing a break of this kind but it is impossible to state what the best method would be without seeing the engine. Brazing, or welding, with an oxygen-hydrogen or oxygen-acetylene flame are two methods very much in use. In some cases a solution of salammoniac poured into the crack will close it more or less effectively if the metal in the casting is iron or steel, but this process is not recommended. If there is a foundry at hand a repair can be made there by fusing the broken parts together by pouring molten metal upon them. A pasty compound is used by plumbers for a similar purpose. It is rubbed into or over the crack and will sometimes cement it together temporarily.

Heavy Oil Engine Not Suitable for Commercial Vehicles

Editor, Commercial Vehicle—For sometime I have been hearing of the heavy-oil type of engine. It has been successfully applied in stationary and marine work. Why could it not be used for trucks, especially those of the heavy type?—D. C. Elton, New Orleans.

It is true that several examples of the type you mention have been found satisfactory for ship and mill use but up to the present time no modification has appeared which renders the heavy-oil engine suitable for use on commercial vehicles. The types so far developed are too heavy and cumbersome and have not sufficient flexibility for the purpose.

What Does It Cost To Run a Motor Wagon?

Editor, Commercial Vehicle—What does it cost to run a motor wagon? I am using four teams in the coal business and wonder if I could use motor trucks to better advantage. Can you tell me something of the cost?—J. H. D., Omaha, Neb.

The cost of running the motor truck compared to the horse system will depend almost entirely on the amount of time through the day during which you can keep the truck in actual operation. It costs \$5 to \$6 per day to operate a team under average conditions, say, and \$10 to \$12 per day to operate a motor truck of equal capacity. It stands to reason, then, that for a financial paying proposition outside of extra facility of service, the motor truck must make either twice the mileage of the horse team per day or carry twice the tonnage of aggregate loads. Doing this will make the motor truck break even on cost with the horse vehicle. If one can both carry *twice the load* and cover *twice the mileage,* as many truck users are doing—most trucks used sanely do the work of 3 to 4 teams—*the vehicle is doing 4 times the work of a single 2-horse team.*

The daily mileage and tonnage possible determine the cost. If the truck is hindered by traffic or poor facilities for dropping its load—a condition often met with in coal work—so that it can operate but the same mileage as a horse rig or carry the same tonnage per day, you cannot use it successfully.

But when considering actual cost, it is not enough merely to account for figures alone, money spent, that is to say; the greatest asset on the side of the motor truck is its efficiency, it is four times as efficient as the horse, if used correctly, consequently it does four times as much work, increasing the bulk of work done by exactly double, and completing the sum of its efficiency by greater accuracy of service and by extending the market double its former area. The owner of a truck pays exepenses and reaps profit.

Study, then, your present horse system. See if conditions are such that a motor truck by quicker loading and quicker unloading could make twice the trips a day that your horses are doing. If so trucks can be made to pay in your work in the matter of actual cost.

Even if this cannot be done consider the service conditions and plan again. The motor truck can operate without hindrance on the days when slippery weather keeps your horses almost at a standstill just when customers demand the most service. This season is when you cannot give service with horses. Trucks in slippery seasons would save many a kick and keep many a customer. Service in most work is more important than a little extra cost of delivery, but don't buy motor trucks until you have a complete system planned out for their use—and then start with one and learn.

Electric Light System Much More Efficient

Editor, Commercial Vehicle—I am thinking of substituting a dynamo electric light system for the kerosene oil lamps now in use on my truck. Which is the better, all things being considered?—W. K. Anderson, Atlanta, Ga.

You will find the electric light system much more efficient and, excepting the first cost, cheaper, as the dynamo is driven by the engine and the current generated by the dynamo charges the storage battery, which in turn, supplies the current for the lights.

Is Gasoline Falling Off in Quality?

Editor, Commercial Vehicle—I have been operating one of the buggy type light delivery wagons for a number of years and it seems to me that the gasoline on the market at the present time is not as good as that which was to be obtained at the same price or cheaper several years ago. Is gasoline falling off in quality or is it due to the fact that my engine is no longer new that I do not get as good results?—Frank Souther, Denver, Col.

About ten years ago gasoline was plentiful and, in fact, it was sometimes hard to dispose of it. As far as possible, refiners ran their crudes and the gasoline of those days was of a high Beaume gravity and very volatile. Naturally, it combined with the oxygen of the air more rapidly than a heavier product and when the mixture was burned in the cylinders the residue was a minimum.

When the demand for gasoline increased with the more common use of automobiles, the refiners increased the percentage of gasoline distilled from a given quantity of crude oil. The result is that the gasoline on the market at the present time is of a lower gravity than the earlier product and not nearly so volatile. Consequently, when it is used in the motor it does not combine so quickly with the air to form a perfect mixture and, as a result, combustion is not always complete and a considerable quantity of residue accumulates in a comparatively short time. The fact that your engine is old should not materially affect the results obtained with the gasoline provided you have kept it in reasonable repair.

Getting the Cam Shaft In Position

Editor, Commercial Vehicle—I dismantled the engine in my truck a short time ago and in reassembling it discovered that there are no markings on the cam shaft to indicate the position in which it should go. Can you tell me how I can get it back into place?—G. Duffey, Worcester, Mass.

The crank shaft should be turned to the position for opening or closing one of the valves. The marks on the fly wheel will be of use in determining this. Put the cam shaft in place, the cam being in position to open or close the valve as the case may be. If this is not possible at the first trial, shift the cam shaft gear one tooth in the direction required to correct the error. The timing should be tested in the regular manner. When all the cams are in their proper position on the shaft, this method may be used in a single or multi-cylinder engine.

Valve Not Properly Adjusted

Editor, Commercial Vehicle—I have a 2-ton truck which up to the present time has given very satisfactory service. Lately, however, I have discovered a sharp clicking noise in the engine. Will you please give the reasons for this noise?—A. E. Richmond, Baltimore, Md.

This sharp clicking noise is very likely caused by the valves not being properly adjusted. There may be too much clearance between the valve tappet and the end of the push rod. Loose piston rings combined with insufficient lubrication have also been known to cause this sound. Sometimes the clicking is caused by the spark being too far advanced when the throttle is well open.

Trouble in Connection With the Magneto

Editor, Commercial Vehicle—I have a truck which has given me excellent service until recently when I was running it, heavily loaded, up a steep hill. Suddenly the engine began to misfire and ceased to pull. If I had not applied the brakes at once the machine would have backed down hill. I got out and blocked the wheels with large stones and then attempted to locate the trouble. There was plenty of gasoline in the tank, the adjustments of the carbureter were correct and the spark plugs were not carbonized. The wiring seemed to be all right and there was plenty of oil in the crank case. The only point remaining to be examined was the magneto. This is shaft-driven and appeared to be in excellent condition as far as I could tell by looking it over, the points being clean and everything shipshape. Finally, I was obliged to allow the truck to back slowly down the hill and managed to get it into a barn. I confess myself unable to solve the problem and apply to you for advice.—Edward Stickle, Philadelphia, Pa.

From the symptoms you mention and the fact that the gasoline supply, carbureter, spark plugs and lubrication were all right, it would seem that the trouble is connected with the magneto. As you say, the instrument itself is in good condition, the probable cause of your engine's sudden loss of power is the slipping of the magneto drive shaft, due to a loosening of the set screw, if one is used, or to the shearing off of the pin or bolt used to secure the drive shaft of the magneto to its sleeve. If you will examine the shaft and sleeve and, taking pains to secure the former adjustment, tighten up the set screw or replace the pin or bolt, you will probably find your motor just as efficient and powerful as ever.

Repairing a Broken Spring

Editor, Commercial Vehicle.—When my truck was some miles from the nearest garage and traversing a bumpy, hilly road, a bad watershed at the foot of a steep grade proved the last straw for one of the front springs and it snapped. The driver had a great deal of trouble in covering a short distance to a farmhouse, from which he telephoned for assistance. It took some time to get the repair men from the garage, and then they were very slow in fixing up the truck so that it could reach the garage, where it remained for a whole day having a new spring installed. The delay in bringing the truck in was very annoying to me, as was also the bill for the work, and I would like to know if there is not some way of making a quick repair, so that if such an accident occurs again my driver will be able to bring the machine into town by himself.—E. F. P., Atlanta, Ga.

There is a very simple method of repairing a broken spring temporarily so that the truck may travel for some time, even over poor roads, if driven carefully. If your driver had proceeded as follows he would doubtless have been able to bring the truck into the garage himself: Place the jack on a large stone or on top of a number of pieces of plank piled upon one another so that it will be high enough to lift the weight of the body of the machine off the broken spring. Then secure a piece of scantling, if possible, which is about as wide as the normal space between the axle and the frame of the truck. If this cannot be obtained, a number of pieces of plank, bound into a block with rope, cord or wire, will suffice. Place this block between the axle and the frame, resting on the broken spring, and fasten it in place with straps, rope or wire. Then lower the jack so that the weight of the truck rests on the block. Careful driving will bring the machine into town.

The Motor Tractor

Results in the Recent Winnipeg Tests—Actual Work Done in the Field By An Avery Tractor

The accompanying tables show the official results of the various agricultural motor tests held in connection with the Canadian Industrial Exhibition at Winnipeg recently, an account of which was published last month. The classification of tractors, set forth in the first column, was as follows:

a. Gasoline engines whose piston displacement is 300 cubic feet per minute and under.
b. Gasoline engines whose piston displacement is over 300 and under 500 cubic feet per minute.
c. Gasoline engines whose piston displacement is 500 cubic feet per minute and over.
d. Kerosene engines whose piston displacement is under 500 cubic feet per minute.
e. Kerosene engines whose piston displacement is 500 cubic feet per minute and over.
The piston displacement to be calculated on a basis of a piston speed of 700 feet per minute, and to be equal to a total piston area in square feet multiplied by 700.

Avery tractors did good work in connection with this exhibition, and some facts and figures are given below by an actual user of an Avery gasoline tractor which serve as a good example as to the general work done by motor tractors in the field.

H. H. Harris & Sons, of Champaign, Ill., have two of these tractors in use, 20 h.p. and 35 h.p. respectively. The number of acres that have been cultivated by them amounts to about 2000. Fifteen acres of 30-year-old bluegrass sod, 6½ inches deep, have been broken in less than 10 hours. From 16 to 18 acres of old ground can be plowed per day.

In regard to disking, five disks are hitched and can disk from 65 to 80 acres a day, double disk.

The tractor has three speeds. In plowing the second speed is used, giving a little over 3 miles an hour. The high speed is used for cutting grain, this giving a speed of 4 miles per hour or more.

Two 8-foot McCormick binders are attached, and each machine does 50 acres or better per day, doing just as good work as could be done by horses; in fact, there is less grain left, because the binders can be run steadier.

The use of gasoline has not yet been reduced to a fine point, so accurate figures are not given with regard to this. The number of gallons used is kept by the driver of the

Official Results in Agricultural Motor Competition

CLASS 76 SECTION	Entry Number	MAKER'S NAME	ECONOMY BRAKE TEST H.P. Hours per Unit of Fuel	H.P. Hours per Unit of Water	Steadiness, Vibration, Condition	Total	MAX. BRAKE H.P. Maximum H.P. Economy	Evenness of Load	Condition of Engine
		Highest Possible No. of Points, Internal	154	15	30	190	35	20	10
		Highest Possible No. of Points, Comb Steam	140	35	15	190	35	20	10
B Gasoline	2	Canadian Heer	125.5	15.	20.4	169.9	17	14	9
	3	Avery	124	7.2	73.6	154.8	25	18	10
	4	J. I. Case	128	14.2	23.9	166.1	14	16	10
	5	Goold, Shapley, Muir	105.7	15	18.3	138.9	15	17	10
	6	International Harvester Co.	132.8	6.8	18.8	158.4	23	15	9
C. Gasoline	7	Sawyer-Massey	97.8	14	26.4	138.2	23	18	10
	8	International Harvester Co.	134.1	6.1	19.5	159.7	18.5	19	10
	9	International Harvester Co.	123	6.6	21.5	151.1	23.5	17	10
	10	Goold, Shapley, Muir	withd	rawn	...	....	..		
	11	Canadian Holt	108.8	15	25	148.3	20.5	17	4
	12	Aultman-Taylor	145	5.9	24.4	175.3	23	18	10
	13	J. I. Case	104.3	6.4	22.6	133.3	22.5	19	10
	15	Diamond Iron Works	88.7	14.5	25	128.2	18	17	10
D. Kerosene	1	Canadian Heer	114.2	14.2	20	148.4	17.5	14	9
	16	Rumely	92.1	7.3	20.3	119.7	29.5	19	10
	18	International Harvester Co.	124.6	6.1	21.3	152	18.5	19	10
	19	Avery	135.5	11.2	21	167.7	14	17	9
E. Kerosene	21	International Harvester Co.	131.4	6.5	23	160.9	21	19	10
	22	Aultman-Taylor	138	6.4	27.7	172.1	18.5	18	10
	25	Rumely	145	9.9	20.9	175.8	31	16	10
	24	J. I. Case	86.9	5.9	23.9	116.7	25.5	17	9
F. Steam	25	J. I. Case	100.3	29.6	13.5	143.9	33	15	10
G. Steam	26	J. I. Case	111.3	33.5	14.1	158.9	21	18	10
H. Steam	27	J. I. Case	140	15	7.45	167.45	27	15	[illegible]
	29	Sawyer-Massey	99.8	34.8	8.95	143.55	23	14	[illegible]

Cause of Penalties: No. 11 for withdrawing from brake test to adjust engine; No. 19 for
when dynamometer readings were being taken.

Official Results in the Plowing Tests of the Agricultural Motor Competition

CLASS 76 SECTION	Entry Number	MAKER'S NAME	Number of Bottoms	Width of Plow, Inches	Maker of Plow	Miles Traveled (Not Including Turns)	Length of Furrow, Feet	Number of Times Across Field	Average Width of Plowed Land, Feet	Acres Plowed	Average Depth, Inches	Total Time Required, Minutes	Time Lost Due to Plows, Etc., Minutes	Time Lost Due to Engine, Minutes
B—Gasoline	2	Canadian Heer	4	14	Crockshutt	6	3955	8	37.6	3.41	3.5	238.5	14.0	4.5
B—Gasoline	3	Avery	4-5	14	Avery	6	3955	8	42.9	3.90	3.5	186.0	5.5	0
B—Gasoline	4	J. I. Case	5	14	Case Sattley	6	3955	8	4.72	4.70	3.5	188.2	0	0
B—Gasoline	5	Goold, Shapley, Muir	4	14	Cockshutt	6	3955	8	37.5	3.41	3.75	184.0	13.0	0
B—Gasoline	6	International Harvester Co.	5	14	Oliver	6	3955	8	46.4	4.21	3.5	181.0	4.0	0
C—Gasoline	7	Sawyer-Massey	5	14	Deere	6	3955	8	46.7	4.24	3.5	202.8	4.5	
C—Gasoline	8	International Harvester Co.	9-10	14	P. & O.	6	3955	8	88.1	8.00	3.5	200.0	3.0	0
C—Gasoline	9	International Harvester Co.	8	14	Oliver	6	3955	8	75.8	6.79	3.5	185.4	5.2	0
C—Gasoline	10	*Goold, Shapley, Muir	......	......	......	......	......	......	......	......	......	......	......	......
C—Gasoline	11	Canadian Holt	7-8	14	Cockshutt	6	3955	8	67.6	6.14	3.25	177.0	0	0
C—Gasoline	12	Aultman-Taylor	9	14	Deere	6	3955	8	81.2	7.38	3.5	153.0	0	0
C—Gasoline	13	J. I. Case	10	14	Case-Sattley	6	3955	8	92.1	8.36	3.5	212.0	4.0	3.0
C—Gasoline	15	Diamond Iron Works	10	14	Deere	6	3955	8	90.9	8.25	3.5	211.5	1.5	2.0
D—Kerosene	1	*Canadian Heer	......	......	......	......	......	......	......	......	......	......	......	......
D—Kerosene	16	Rumely	5	14	Rumely	6	3955	8	45.5	4.13	3.5	204.0	7.0	0.7
D—Kerosene	18	International Harvester Co.	4	14	P. & O.	6	3955	8	34.7	3.16	3.5	193.0	0	0
D—Kerosene	19	Avery	4	14	Avery	6	3955	8	37.3	3.39	3.5	184.0	2.5	2.7
E—Kerosene	21	International Harvester Co.	8	14	P. & O.	6	3955	8	73.6	6.68	3.61	184.0	4.0	0
E—Kerosene	22	Aultman-Taylor	7	14	Deere	6	3955	8	62.9	5.71	3.5	155.0	0	3
E—Kerosene	23	Rumely	8-9	14	Rumely	6	3955	8	77.4	7.03	3.6	217.7	8.4	0
E—Kerosene	24	J. I. Case	8	14	Case-Sattley	6	3955	8	76.1	6.90	3.5	206.0	3.0	0.5
F—Steam	25	J. I. Case	6	14	Case-Sattley	6	3955	8	56.5	5.13	3.4	179.9	7.7	8.0
G—Steam	26	J. I. Case	10	14	Case-Sattley	6	3955	8	93.3	8.47	3.5	171.0	2.2	0
H—Steam	27	J. I. Case	12	14	Deere	6	3955	8	114.2	10.37	3.5	178.0	7.0	0
H—Steam	29	Sawyer-Massey	10	14	Case-Sattley	6	3955	8	89.4	8.12	3.5	186.3	7.5	3

* Withdrawn. †Gasoline. ‡Kerosene

nachine, who is generally a farm hand. In heavy work about 20 to 22 gallons of gasoline are used per day; this is for such work as plowing, disking and grading.

As to the cost per acre of plowing with 5 plows attached o each tractor, plowing from 15 to 18 acres per day, one man at, say, $35 to $37.50 a month, and amount of gasoline and cylinder oil that is used, figured up into the number of acres plowed, would give something like the accurate cost per acre, with gasoline at 14 cents per gallon and cylinder oil at 25 cents per gallon.

Canadian Industrial Exhibition, Winnipeg

PLOWING TEST						DESIGN AND CONSTRUC.							
25	15	10	...	10	215	15	10	5	30				
25	15	5	5	10	215	15	10	5	30				
Acres Plowed per Hour per Econ. Brake H.P.	Quality of Plowing	Distance Traveled Without Replenishing Fuel	Distance Traveled Without Replenishing Water	Condition of Engine	Total	Accessibility	Protection of Working Parts	Ease of Manipulation	Total	Points Penalized	Total Points	Rank	Entry No.
23.4	9	4 4	...	10	143 7	10 5	6	4.25	20 75	...	365.35	5	2
24 7	10	4 5	.....	10	153	8 25	6 25	4 25	18.75	...	379.55	3	3
19 1	9.75	10	.....	10	185 35	6 75	6.75	4 75	18.25	...	411.7	1	4
17.8	9.5	7 6	.....	10	180.7	12.75	6	4	22.75	...	384 35	2	5
20 2	8 5	7 8	.....	10	138.9	11	6 75	4.25	22	...	366.3	4	6
19 7	8 5	4 9	.....	10	155	8.75	6.75	4 5	20	...	364 2	5	7
21 8	9 75	6 3	.....	10	175.55	11	5 75	4.25	21	...	403.75	2	8
22.9	7 75	4 1	.....	10	146 25	9.5	7.25	4.75	21.5	...	369 35	4	9
...	...	...	...	...	.....	...	...	...	...	...	.....	...	10
23	10 25	6 5	.....	10	194 55	11.25	5.25	3 75	20.25	29	380 6	3	11
25	9 25	6 9	.....	10	199.15	10 75	7	4 5	22 25	...	447 7	1	12
21 8	10.25	8 2	.....	10	152.95	10.75	8 5	4.25	23 5	...	361.25	6	13
22 9	9 25	3 9	.....	10	151.45	8.5	8 75	3.5	20.75	...	343 4	7	15
...	...	...	...	...	.....	10 5	6	4 25	20 75	...	.....	...	1
24 6	10 5	4 6	.....	10	152.8	11 5	7	4 5	23	...	354	2	16
19.8	10 25	10	.....	10	176.15	10.5	7.25	4 75	22.5	...	398.15	1	18
20 4	9	3 5	.....	10	126.5	8.25	6 25	4 25	18 75	15	336.95	3	19
22 8	10.5	4 2	.....	10	159 5	9.5	7 25	4 75	21.5	...	391.9	3	21
20 8	7.5	6 9	.....	10	174 6	10.75	7	4 5	22 25	...	415 45	2	22
20.4	11 25	9 8	.....	10	203.45	10 25	6 75	4.5	21 5	8	449 75	1	23
19.9	9	7 1	.....	10	126.6	10.75	8 5	4 25	23.5	...	318.3	4	24
22.2	9.5	3 1	4 3	10	160.6	13.5	8	4	26.5	...	389	1	25
19 6	10 5	3 5	4 5	10	203.1	13 5	8	4	26.5	...	437.5	1	26
12.1	8 5	5	4.5	10	191.4	15	8	5	29	...	442.85	1	27
18	11	1 5	5	10	150.9	14	8	4	27	...	364.15	2	29

sentative talking to operator during the brake test. No. 25 for setting plows deeper

One man does the work of disking and plowing. Cutting oats and wheat requires three men, one to run the tractor and one man to each of the binders, to dump the grain and see that everything is working properly.

Mr. H. H. Harris says that the tractor is the most labor-saving investment ever used on the farm. For hauling grain to stations, pulling up trees or anything of that kind, he considers it almost indispensable. No trouble at all has been experienced. Some 1200 acres of oats and wheat have just been threshed. The engines are attached to 35-50 Russell separator, and while the grain has been very wet and not in the best condition to handle, they go right along without any trouble whatever, there seldom being a need to put a wrench on or to make any adjustment.

It should be noted in connection with the article on the Winnipeg tests that appeared in this magazine last month that the titles of the two pictures at the bottom of page 62 should have been reversed, the picture to the left showing the Rumely oil-pull, grand champion, and that to the right the Case 60-horsepower steamer, winner of gold medal.

Increased Output of Goodyear Tires

EXCAVATIONS are being made for another big building at the Goodyear Tire & Rubber Co.'s plant, Akron, O. This addition to the factory will be 400 ft. long and 80 ft. wide. It will be 6 stories high, with basement, and will be made as nearly fireproof as possible. The Goodyear Co. is also adding two stories to two of the present buildings. Each of these buildings is 450 ft. long and 60 ft. wide. The new buildings and the two new stories will give the plant additional floor space of 266,000 ft., making in all a total floor space of 1,266,000 sq. ft.

The additions and the new building are being erected for the purpose of taking care of the increase of the automobile tire business, and the output of Goodyear no-rim-cut tires and other lines. At the present time the Goodyear Tire & Rubber Co. is turning out 5000 tires a day; the new buildings will enable the company to turn out 8000 a day. The company employs 5000 men; 2000 more will be employed.

n Connection with Canadian Industrial Exhibition, Winnipeg, July, 1912

per Hour	Miles Traveled per Acre Plowed	Average Drawbar Pull, Pounds	Average Drawbar, Horsepower	Fuel Used, Including Turns, Pounds	Drawbar Horsepower Hours per Unit of Fuel	Pounds Fuel Used per Acre Plowed	Water Used, Pounds	Pounds Water Used per Acre Plowed	Average Drawbar Pull per 14-in. Plow	Drawbar Horsepower per Acre per Hour	Possible Miles Traveled Without Replenishing Fuel	Possible Miles Traveled Without Replenishing Water	Possible Acres Plowed Without Replenishing Fuel	Possible Acres Plowed Without Replenishing Water	Pounds Water per Drawbar Horsepower Hour	Cost of Fuel per Acre Plowed, Cents	Entry Number	Drawbar Horsepower Hours
96	1 76	3010	13 56	70 5	0 682	20 67	4.5	1.32	752	14 09	14.10	91.6	8 0	16.1	.094	57.6	2	48.1
.34	1.54	3135	17.22	65 5	0 705	16 79	91 5	23 46	660	12 85	14 56	13.9	9 5	90 0	1.85	46 8	3	50 1
.41	1.41	4450	23.41	70 25	1.012	16 45	4 25	0.99	890	16 64	32.00	322.0	22 4	22 9	.060	45.8	4	71 1
26	1 76	5680	21.64	58 5	1 005	17 15	10 75	3 15	920	17.24	24 20	67.5	15 8	38 4	.183	47 8	5	58 8
39	1 42	3610	20 42	79.5	0 726	18 88	302.75	71 90	722	13 70	25.1	20.0	17.6	14.0	5.25	52.6	6	57 7
34	1 41	4985	25 70	98 75	0 807	23 29	9 5	2 24	977	18.79	15 7	182 0	11 1	128.5	.119	64 9	7	79 7
.56	0.75	6669	34.10	107.0	0 996	13.38	420.0	52 50	684	13.31	20 3	16.5	27 0	22 0	5.94	37.3	8	106.6
37	0 88	6130	35 91	141.0	0 729	20 76	87.75	12.92	804	15.13	13.1	61.8	14.9	70.0	85 4	57 8	9	102 7
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	.....
.18	0 98	6318	35 96	94 0	1 077	15 30	0	0	874	16.51	20 8	....	21.3	....	....	42.6	11	101.3
08	0 81	7080	47 14	97 5	1 160	13 22	408.0	55 30	787	15.33	22 0	15.9	27.1	19.6	3 61	36 8	12	113 1
51	0 72	7200	37 29	155 75	0 789	18 63	488 5	58 43	770	14.72	26 2	13.0	36.6	18.0	3.97	51 9	13	123.0
49	0 73	7350	35 50	156 5	0 750	18 96	0	0	735	14.24	12 4	....	17 0	....	....	52.8	15	117.4
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
.32	1 45	4400	22 40	124 25	0 566	30 08	176.0	42 60	880	17.02	11.5	8.9	7.9	6 15	2 50	55.2	16	70 3
06	1 89	3450	18.48	76 5	0 721	24 21	223.5	70 72	863	17.45	25.2	12.7	13.6	6 66	4.05	44 4	18	55.1
.18	1 77	2900	16.12	† 3 0 ‡105 0	0 429	31 85	50.0	14.74	725	13.67	8.8	25.5	5.1	14 4	1.08	58.4	19	46 3
2.32	0 90	6595	36 67	† 1.0 ‡171 5	0 611	25 82	196.75	29 45	828	15.76	10.7	27.5	12.0	30.6	1.87	47.4	21	105.4
2 37	1.05	5716	37.88	† 8 0 ‡115 0	0.743	21.54	374.5	65.58	817	16.00	17.5	17.3	16 6	16.5	4.10	39.5	22	91 3
2.20	0 85	6880	34 82	‡129 25	0 851	18.38	167.5	25 82	834	15.62	24.7	25 0	29 1	29.0	1 52	33.7	23	109.9
2 21	0 86	6550	33 22	† 0 25 ‡227.0	0 461	32.65	619.0	88 93	819	15.04	18.0	10.1	20 8	11.8	5.91	59 9	24	104.7
1 97	1.17	5060	31 06	765	10 57	149 12	5050	984 4	845	15.75	7.8	1.7	6 7	1.45	62 45	65 4	25	80 9
3 13	0 71	8050	47.69	826.5	15 56	97.58	6780	800 4	805	15 18	8 8	1.8	12.4	2.5	52 70	41.5	26	128 6
3.79	0.58	9750	57 00	1030 0	15 13	99 32	9704	945 8	812	15 02	12 6	1 8	21.8	2 3	62.28	42.2	27	155 8
2.97	0.74	7900	46 17	1266 5	9 97	155 97	7970	941 5	790	15,55	3.7	2 0	16 9	2.7	63 13	66 3	29	126.2

Horsepower and Gear Ratio in Trucks

Continuation of E. P. Batzell's Paper—Types of Motor Used for Frequent High or Low Speed Work—Communication From E. P. Batzell on Commercial Motors for Commercial Cars

Part II

IN the case of an irregularly acting motor, showing from the beginning a rising value of the pressure diagram area, the maximum of the developed torque will be at lower revolution per minute than that of the area, and also at the point where the increase of one item is compensated by the decrease of the other. To make the foregoing somewhat more clear let curve A, Fig. 4. represent the elapsing of the pressure diagram area values, and the lines L_1 and L_2 the mechanical losses decreasing and rising respectively as the motor runs faster. With the first kind of losses the torque maximum is reached at a point T_1, where the dotted line parallel to the line L_1 touches the line A. With the other kind it will be in T_2. As above stated, the torque maximum will be located correctly when all lines, those of the losses and of the diagram area are drawn in a proper proportional scale; for example, all of them taking the respective horsepower for their scale unit. By a similar action the torque maximum will be found in points t_1 and t_2 when the diagram area gives a curve of the shape A_2, points t_1 and t_2 being spaced after and before the climax of the latter.

It follows from the foregoing that the shape of the curve representing the developed motor torque resembles that of the pressure diagram area curve. They differ from each other only through changes effected by the introduction of mechanical efficiency in the former. Suppose that curves P and T, Fig. 5, represent the elapsing of developed power and torque. starting at the lowest practical speed of the engine. Should a straight line m, passing through the diagram zero point O, touch the power line P only at its beginning, the corresponding torque curve T will be a gradually dropping one, indicating that the conditions in the motor are identical with those described above in connection with the finding of point T_1, Fig. 4. The fact of such a relation between curves P, T and m should be explained briefly. The motor torque is generally directly proportional to the motor power and inversely proportional to the speed at which this power is developed. In other words, one could write

$$T = \frac{P}{S} \times K,$$

where S is the motor speed and K a constant. A straight line n passing through center O to a point 1 on the power curve forms with the ordinate of motor revolutions an angle a, the tangent of which can be expressed so: tang a $= \frac{P_1}{S_1}$. Consequently the motor torque becomes proportional to the tangent of the angle which is formed by the revolution per minute ordinate and a straight line from center O to the desired point on the power curve.

Similarly, when dealing with power and torque curves P_2 and T_2, Fig. 6, one would come to the result that the maximum of the motor torque is located at T-maximum at the revolution per minute where the line O-m touches the line P_2. This moment does not correspond to the lowest motor speed, but to a higher one, which indicates that the motor conditions are such as were referred to when finding point T_1-maximum, Fig. 4, or the points t_1 and t_2 maximum of the same figure. Which of these actually belongs to the characteristic of the given motor could be settled only by means of the mechanical motor losses or by the elapsing of the pressure diagram area, either of which must be known in character and in value. They could be determined through subsequent motor tests; then one could tell from the curves obtained whether the motor performance is proper, with good carburation and tight cylinders.

Power and Torque Curves Depend on Motor

WHICH shape of power and torque curves is the most desirable depends on the kind of motor action anticipated in service. A motor with characteristics as shown in Fig. 6 is preferably of high-speed type, because it has the torque maximum at a higher revolution per minute than a motor possessing characteristics as shown in Fig. 5, other conditions together with the start at the lowest speed being even. Thus retaining the same rate of torque curve drop in both motors by providing the necessary constructive difference, larger valves and passages, high-speed timing, etc., in the motor per Fig. 6, this latter will have a larger horsepower development than the other at high speeds. The same would be apparent only in a smaller degree if both motors were equally dimensioned in their valves, etc.

On the other hand, the motor per Fig. 6 is entering into an unstable zone at revolutions lower than those corresponding to its torque maximum. At that time, contrary to the logically anticipated state of things, the motor will not respond to a load increase by reducing the revolutions per minute, but by increasing them. This is explained by the fact that in this range of power and torque curves the motor is compelled to run faster to reach a greater torque value, a greater rate of power development. Reversing the matter, in the range of the slowest motor revolution per minute one runs the chance of stopping the motor by taking off its load, whereas motors of the other type would have a tendency to race. Such conditions are meant when referring to this kind of motor speed zone as an unstable one.

(To be continued.)

E. P. Batzell Clears Up Some Points

DETROIT.—In the writer's paper on commercial car motor sizes and drive ratios presented during the Summer S. A. E. meeting some points apparently have not been made entirely clear, judging from some remarks in the discussion and from private conversation with some of the S. A. E. members during the trip. For instance, the opinion seemed to generate in some quarters, that a small bore, high speed motor was recommended for commercial car use. A careful reading of the said paper will disclose the fact that the motor r.p.m. closest to its range of minimum fuel consumption have been selected and recommended for use during the most frequently encountered conditions of the truck service in question. If the truck performs the greatest part of its work with these most economical motor revolutions, the occasional service conditions only will be overcome with a fuel consumption above the minimum which the motor is capable of showing. The chief aim of a large part of the paper was directed towards the finding of the most economical motor r.p.m. with different throttle opening and of governing the location of these r.p.m. in the total range of motor speeds. By mere theoretical reasoning, which was remarkably well confirmed by the results of several tests, it was found that the minimum fuel consumption per developed horsepower with full throttle opening cannot be located at very high piston speed, perhaps with the exception of motors specially built for extra high speed, which by the way would not suit commercial car requirements. At any other rate of smaller throttle opening the minimum fuel consumption per horsepower is to be found at a lower r.p.m. of the motor than the minimum with full open throttle. Consequently the basic requirement for economical operation of the truck motor, as it was thought to be explained in the paper, imposes the condition that the motor should not be run at a speed exceeding the most economical r.p.m., unless for very short duration. Under the most frequent normal load the motor should run with full throttle and at a speed equal to the most economical r.p.m. and under any other more or less continued service conditions, when the motor works with partially open throttle, its r.p.m. should not be higher but rather lower than under normal conditions.

Smaller Bore Motor Offers Sufficient Power

This manner of motor functioning and its successful use depend entirely on the existing truck transmission ratio—ratio between motor and driving wheels—and the skillful manipulation of the available combinations according to the required tractive effort at the wheels. A four-speed gear set does not represent an unusual complication, which the average truck driver would not be able to operate properly a short time after being correctly instructed in the principlese. And as disclosed in the paper, the four-speed transmission offers enough variety in ratios to enable one to use the small piston displacement motors at their economical speed as outlined. In other words, the smaller bore motor of much smaller bore than is often in vogue now, offers sufficient power and torque for successful use in commercial cars without necessity of being driven at high speed, because they are ample in size to deliver this power and torque at piston speeds not exceeding 1000 ft. per minute. The latter figure matches well with the piston speed in stationary engine practice. Consequently it remains merely to dimension the commercial car motors according to data from stationary engine practice like specific bearing pressure of the piston and of the crankshaft, moving parts and bearings in the valve mechanism, etc., to obtain an engine with as little wear on its parts as in the engine for power stations. The specific pressures causing wear in the moving parts being the same in both cases, the piston speed being the same and the relative velocity in the other parts being made as much as possible the same—the actual amount of wear per mile of surface also will be the same. It is true the larger engines for stationary purposes can stand a much greater actual amount of wear in inches than the smaller automobile motor, and therefore, it would be well to decrease some of the mentioned datas especially for parts, the replacement of which is more or less connected with difficulties. That is being actually done in the present special commercial car motors for instance, the specific surface from the side thrust is maintained a few times smaller than is practice for stationary engines, the same refers to connecting rod and crankshaft journal bearings, etc. Thus it would seem that it is no difficult problem to build, install and work economically in commercial car service of special small piston displacement motors, the proportions of which could guarantee an extent of durability very little less than one is accustomed to expect from stationary engines.

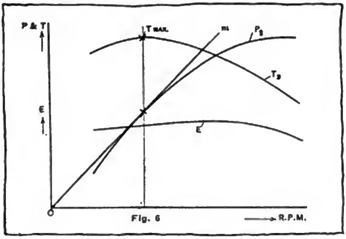


Fig. 6

The above indicates that only one chassis would be sufficient for the 500 lb. delivery car, two would be essential for the 1-ton, 2-ton, 4 and 5 ton up cars, while the 3-ton vehicle would have two more frequently used chassis and one for very severe service. Considering that the chassis difference due to the motors will often coincide with special features already required by the prospective user, the above proper motor selections should not be looked upon as causing undue complications.—Eugene P. Batzell.

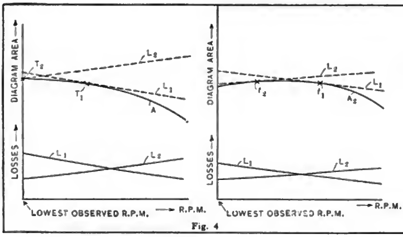


Fig. 4

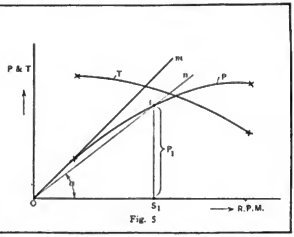


Fig. 5

TRADE and PERSONAL ITEMS

Auto Bus Installed by the McLaren Hotel and Motor Vehicle Owned by the Walker-Gordon Laboratory

Totals of 58,000 and 124,000 miles are recorded for two worm gears used in the final driving mechanism of two motor trucks in England. Recently the Pierce-Arrow Motor Car Company of Buffalo announced the adoption of this for its five-ton truck, and it is believed that in the next few years the mileage on this side of the Atlantic will be just as large as that in Europe.

The Central Delivery Co., Tremont, O., is considering the matter of disposing of its horse-drawn equipment and installing a complete motor-propelled outfit.

John Wanamaker, of Philadelphia, Pa., purchased his first motor delivery vehicle over three years ago, and today has over 100 motor trucks and delivery wagons.

Fred. Browning has become manager of the truck department of the White Company, Philadelphia, Pa. Mr. Browning was formerly Philadelphia branch manager for the Autocar Co., and later with the Continental Motor Car Co.

The Winnipeg Motor Omnibus Co., Ltd., Winnipeg, Manitoba, has been incorporated to operate a motor bus service in that city. There is a capital stock of $4,000,000 in the company; many of the prominent business men in the city of Winnipeg are interested in the venture, and the proposition at present is to purchase fifty cars and to operate them over regular routes that have been mapped out, charging the same fares as are at present charged by the trolley system.

Truck Market Possibilities for American Commercial Vehicle Makers

The purchase of motor-driven patrol and police ambulance and motor combination chemical and hose truck is being considered by Utica, N. Y.

A motor-driven ambulance for the White Plains Hospital, White Plains, N. Y., was recently put into service.

Lowell, Mass., will purchase three motor-driven fire engines.

The city council of Davenport, Ia., recently purchased a tractor for the hook and ladder and a motor life hose wagon.

Wesley Engine & Hose Co., Asbury Park, has purchased a motor combination hose and chemical wagon.

Clarksdale, Miss., will purchase a motor-driven chemical and hose wagon.

Champaign, Ill., is considering the purchase of motor fire apparatus.

Efforts are being made by Mayor Martin and other members of the Council of Helena, Ark., to provide the local fire department with motor-driven fire apparatus.

Durango, Colo., has purchased a motor-driven fire truck.

Meriden, Conn., is considering the purchase of a combination chemical hose wagon.

So. Macon, Ga., will probably be provided with a motor-driven fire engine and hose wagon in a few weeks.

Iowa City, Ia., has purchased a motor-driven fire truck.

Decatur, Ill., has purchased a combination chemical and hose motor truck.

Mayor Fitzgerald, of Boston, Mass., signed the contracts for three motor-drawn combination ladder trucks for the Boston fire department.

Chief T. Howe has asked the city commissioners of Pittsburg, Mo., for motor-driven fire apparatus.

St. Joseph, Mo., is considering the purchase of more motor-driven fire apparatus for the downtown fire stations.

Muscatine, Ia., is considering the purchase of motor-driven fire apparatus.

Charleston, Ill., is considering the installation of modern motor apparatus.

Bids for the purchase of motor-driven fire apparatus were recently received by the purchasing committee of Kankakee, Ill.

Quincy, Ill., is considering the purchase of a motor patrol wagon.

A delegation of Janesville city officials was in Rockford, Ill., inspecting the fire apparatus with a view to purchasing a combination wagon.

The purchase of motor-driven fire apparatus is being considered by Lawrence, Kans.

Two runabouts have been purchased for Chiefs O'Neil and Lefaux of New Orleans, La.

Another motor fire truck has been added to the fire department of Grand Rapids, Mich.

The city council of Winona, Minn., recently determined upon the installation of motor-driven fire apparatus.

Bids were recently received by the council fire committee of Springfield, Mo.

Salisbury, N. C., is considering the purchase of motor-driven fire apparatus.

Florence, N. J., is considering the installation of motor-driven fire apparatus.

Bids were recently opened at the fire department headquarters in New York City for eleven combination fire wagons, with capacity for two 35 gallon chemical extinguishers and storage room for 1,000 feet of hose.

Motor fire apparatus was recently purchased by Canton, O.

The purchase of motor fire apparatus is being considered by Dayton, O.

Mansfield, O., recently held a meeting at which a special representative of the Seagrave Co. was present relative to the proposed new combination hose wagon and chemical engine.

Springfield, O., is considering the purchase of two motor fire trucks and a motor patrol wagon.

W. Scranton, Pa., will purchase motor-driven fire apparatus.

Windber, Pa., has purchased motor fire apparatus.

Fort Worth, Tex., will purchase a combination motor fire pump to be placed in the district of the packeries and stock yards.

Bids were recently received by Waco, Tex., for a combination motor pump and hose wagon and one chief's car.

Cheney, Wash., is considering the purchase of motor-driven fire apparatus.

Chas. E. Reiss & Co., 1776 Broadway, New York City, has been appointed agent of the Stegeman Motor Car Co., Milwaukee, Wis., for the States of New York, Pennsylvania, Maryland and Virginia.

F. B. Lounsberry was recently appointed assistant metallurgist of the H. H. Franklin Mfg. Co., Syracuse, N. Y.

A. Reis Meyer is now connected with the new motor wagon department of the O. Armleder Co., Cincinnati, O.

Frank Briscoe has resigned as one of the vice-presidents of the United States Motor Co. and has sailed for Europe to study European motor car engineering. Mr. Briscoe will continue as president of the Briscoe Mfg. Co., which is one of the subsidiaries of the United States Motor Co.

L. E. Harman, formerly of the Decatur Motor Car Co., Boston branch, has accepted the position of New England manager for Myer Abrams & Co., distributors of Lauth-Juergens motor trucks. This company has built a complete service department and a garage of 12,000 square feet at 139-161 Vassar street, Cambridge, Mass.

Adams Bros. Co., Findlay, O., report a large business being sent in by their Springfield (Mass.) representative, the Sauers Motor Truck Agency.

Toledo Motor Truck Co., Toledo, O., has purchased the assets of the Rassal Motor Car Co., and will operate a truck manufacturing business on a larger scale than formerly.

The Bosch Magneto Co., New York City, recently issued an instruction book covering the Bosch Type ZE1, an enclosed type of magneto serviceable for smaller size single-cylinder motors.

General Motors Truck Co., Detroit, Mich., has issued a booklet entitled "The Electric Truck," giving cost of operation, specifications and a number of illustrations of their chassis, etc.

Hess-Bright Mfg. Co., Philadelphia, Pa., has issued a catalogue describing their ball-bearing hangers.

The B. F. Goodrich Co., Akron, O., recently issued a booklet describing their tires.

George H. Lloyd, sales manager of the Velie Motor Vehicle Co.'s factory, recently announced his retirement.

H. Robinson, who has been connected with the South Bend branch of the Studebaker Corporation for the past five years has accepted the position as sales manager of the truck sales department in Detroit.

Three Peerless trucks were shipped to Porto Rico recently, which were purchased from Manager John L. Snow, of the Boston branch of the Peerless Co. These will be used to transport people from coast to coast.

The Columbus (O.) branch of the Goodyear Tire & Rubber Co. recently moved to their new building at 87 North Fourth street.

Carter M. Bacon, former inspector for the American Locomotive Co., of the Alco cars, will join the Packers service in the capacity of service department manager.

E. H. Wiles has been appointed superintendent of the experimental department of the Velie Motor Vehicle Co., Moline, Ill.

The Baltimore (Md.) branch of the Locomobile Co. of America is now occupying its new home at 109 West Mount Royal avenue. T. W. Wilson is manager.

A. H. Brown has been appointed Northwestern sales manager of the Studebaker Corporation. He was formerly manager of the Spokane branch.

L. H. Rose, manager of the Northwest branch of the Studebaker Corporation, has resigned that position and has accepted the position as head of the Metzger Motor Car Co. agency in the Northwest.

S. H. Fronsdorf is in charge of the new factory branch which has recently been opened by the Motz Tire & Rubber Co., Akron, O., at 300 North Craig street, Pittsburgh, Pa.

The King Motor Car Co., Detroit, Mich., has appointed the Matheson Automobile Co., 170 Victoria avenue, Toronto, Can., as its dealers to cover a large part of the Province of Ontario and a section of the Province of Quebec.

W. H. Moore has been appointed general sales manager of the Gramm-Bernstein Co., Lima, O. He was formerly manager of the sales department of the Gramm Motor Truck Co., with which he is no longer connected.

Front-axle Plant of the Weston-Mott Co., Flint Mich., Showing Operation and Inspection of I-beams

Factory of Stewart Motor Corporation, Makers of Delivery Motor Cars at Randall and Superior Streets, Buffalo, N. Y.

Factory of the M. & P. Electric Vehicle Co. at Detroit, Mich., from Which It Is Planned to Turn Out 400 Cars for 1913

During the two weeks ending July 31 the Packard Motor Car Co. sent out 56 trucks, amounting to $196,000.

Fred Bisantz, formerly of Bowling Green, O., has been made factory manager of the Gramm Bernstein factory at Lima, O.

The Fisk Rubber Co., Chicopee Falls, Mass., is making an extensive addition to its plant in order to take care of the increased demand for tires, etc.

Eager & Son of Bryan, O., conducting a bus service, recently purchased a one-ton passenger truck of the Lauth-Juergens Motor Car Co., Fremont, O., with a seating capacity for sixteen persons.

L. W. Williams, connected with the advertising department of the Locomobile Co. of America, Bridgeport, Conn., recently entered the truck sales department. His associations with this company extended over a long period.

The United States Tire Co. recently moved its general offices to the new United States Rubber Building, Broadway and 58th street, New York. This structure was recently completed and will be utilized in future as the home of the United States Rubber Co. and its subsidiary companies.

The demands being so large for its speedometers, the Jones Speedometer Co., of New Rochelle, N. Y., is trebling its manufacturing facilities by fully equipping with special improved machinery at Bush Terminal, Brooklyn, an additional factory much larger than its plant at New Rochelle. General offices and shipping department will on October 1 be removed to the Bush Terminal.

General Vehicle Co., Long Island City, has recently received the following orders: Consolidated Gas Co., New York City, five 2000-pound and three 750-pound vehicles; Kingan Packing Co., Richmond, Va., two 3½-ton trucks; Æolian Co., one 2-ton truck; Milwaukee Railway & Light Co., two tower wagons; Electric Light Co., four light delivery wagons. This company is also building delivery wagons for nine department stores, including B. Altman Co., Black, Starr & Frost, Arnold Constable Co., and James A. Hearn Co., Jenney Mfg. Co. and D. J. Cutter Coal Co., both companies situated at Boston, recently received their 5-ton trucks.

Commercial Vehicle Incorporations

Seymour Motor Express Co., Seymour, Conn. Capital, $10,000. Incorporators: D. H. Riggs, C. Boles and E. H. Rolston.

R. L. Bishop Motors Co., New Haven, Conn. Capital, $25,000. Incorporators: Raymond Leslie Bishop, William Frank Sargent and Frank Pierce Sargent.

Studebaker Sales Co. of Buffalo, Buffalo, N. Y. Motor vehicle business. Capital, $25,000. Incorporators: Arthur W. Halle, Bradley H. Phillips and E. C. Sehlenker.

Gardner-Hotte Sales Co., Buffalo, N. Y. Motor vehicles, tires, etc. Capital, $10,000. Incorporators: John J. Gardner, Geo. Hotte and William E. Hotte.

Harman-Yount Co., New York City. Motor vehicle business. Capital, $100,000. Incorporators: Daniel H. Hanckel, Frederick B. Hunt and Helen M. Kelly.

Penn Auto Co., Brooklyn, N. Y. Capital, $5,000. Incorporators: Louis L. Wendell, Harry C. Partridge and Morris Wolf.

Maxi Co., New York City. To manufacture carburetors, etc. Capital, $200,000. Incorporators: Edward A. McCoy, Ernest Hopkinson, F. V. W. Richardson and John C. McCoy.

Kelly-Field Co., New York City. To manufacture motor vehicles, tires, etc. Capital, $10,000. Incorporators: Charles F. U. Kelly, Harry E. Field and Jacques L. Boisse.

Industrial Motor Car Co., Middletown, N. Y. Capital, $350,000. Incorporators: William A. Courtland, Cuthbert W. Jewell, M. G. Crawford, Harris H. Rayl, Wheelock Mansions and Montecelle A. Bonneford.

Regal Auto Sales Co., New York City. Capital, $5,000. Incorporators: Max Hart, William M. Botto and Norman E. Mannwaring.

Anti-Friction Bearing Co., Portland, Me. To manufacture bearings for motor vehicles, machinery, etc. Capital, $500,000. Incorporators: Charles H. Chapmen, Jr., Elmer Perry and Stephen C. Perry.

Elliott Motor Engine Co., Boston, Mass. Capital, $300,000. Incorporators: Gilbert R. Elliott, Frank P. Harris and Henry N. Schwartz.

L-M-S Motor Co., Esopus, N. Y. Capital, $10,000. Incorporators: Herbert Cohen, Emil Akder and Joseph J. Baker.

Holt-Chandler Co., New York City. Motor vehicles, etc. Capital, $25,000. Incorporators: Henry E. Holt, Frederick E. Tucker and Warren R. Chandler.

Electric Spark Appliance Co., New York City. To manufacture electrical and other devices for motor vehicles, etc. Capital, $5,000. Incorporators: Michael M. Line, Peter Ross and Alexander Miller.

Pioneer Motor Car Co., Troy, N. Y. Capital, $10,000. Incorporators: Henry J. Richardson, Northrop R. Holmes and George N. Nay.

Central Motor Car Co., Canton, O. To engage in motor vehicle business. Capital, $100,000. Incorporators: R. F. Wilson, D. L. Tschantz, D. R. Wilson, Maggie Tschantz, Emma Wilson and Anna Herr.

Cincinnati Motor Car Co., Cincinnati, O. To manufacture commercial vehicles. Capital, $10,000. Incorporators: C. D. Wilson, H. C. Helsey, M. C. W. Shepler, J. C. Miller and R. M. Comer.

Service Motor Truck Co, Camden, N. J. Motor vehicle business. Capital, $50,000. Incorporators: R. L. Smith, C. D. Hackett and E. J. Eldridge.

A. H. Meyer Motor Car Co., Cedarburg, Wis. To manufacture motor vehicles. Capital, $25,000. Incorporators: J. Armbuster, J. Dietrich and J. F. Bruss.

Hercules Motor Truck Selling Co., Detroit, Mich. Motor vehicle business. Capital, $50,000. Incorporators: A. Smith, J. O. Murfin and W. E. Webb.

Ex-Cal Motor Truck Co., Jamesburg, N. Y. Capital, $250,000. Incorporators: T. C. Corwin, A. Englehart and A. A. Kelley.

Brown Commercial Car Co., Peru, Ind. To manufacture commercial trucks and parts. Capital, $100,000. Incorporators: R. H. Bouslog.

W. H. McIntyre Co., Toledo, O. To deal in commercial trucks, etc. Capital, $10,000. Incorporators: W. H. McIntyre, Edward L. Laskey, Clara McIntyre, William G. Vollmayer and Frank C. Kelley.

Consolidated Auto Co., Columbia, S. C. To deal in motor cars and supplies. Capital, $5,000. Incorporators: J. B. Roddey, John J. Cain and J. P. Matthews.

Wm. Strathmann, Inc., New York City. To manufacture and deal in motors, motor vehicles, etc. Capital, $50,000. Incorporators: William Strathmann, Herman C. Birkemeyer and John H. Semken.

Autodrome Co., New York City. To deal in motor vehicles, etc. Capital, $50,000. Incorporators: Harry L. Curran, Clara D. Curran and Benj. B. Jones.

Mutual Motor Car Co., Buffalo, N. Y. Capital, $12,000. Incorporators: Albert Poppenberg, Frederick C. Carter and Orson E. Yeager.

D. Henry Bonner Co., Cambridge, Mass. Motor vehicle business. Capital, $20,000. Edward S. Howland, D. Henry Bonner and William E. Furniss.

Co-Operative Auto Sales Co., Boston, Mass. Capital, $10,000. Walter B. Angell, Clarence E. Walden and Agnes E. Myers.

Republic Motor Co. of Massachusetts, Boston, Mass. Capital, $1,000. Incorporators: Ernest J. Ellenwood, Norman J. McGaffin and El M. Churchill.

Newmastic Co., New York City. Rubber goods and tires. Capital, $250,000. Incorporators: Orrel A. Parker, Robert Weld and Oliver H. Bartine.

D. M. Dirman Co., Geneva, N. Y. Motor vehicle business. Capital, $10,000. Incorporators: D. M. Dorman, Charles C. Runyan and Louis J. Licht.

Hurlburt Motor Truck Co., New York City. Capital, $150,000. Incorporators: Joseph F. Carroll, William B. Carswell and F. D. Peale.

Pope Motor Car Co., New York City. Capital, $100,000. Incorporators: Francis F. Walbridge, Gilbert M. Stratton and Chester M. Stratton.

Monitor Motor Co., Boston, Mass. Capital, $20,000. Incorporators: Howard P. Soule, Gardner W. Chase and Richard S. True.

Brockway Motor Truck Co., Cortland, N. Y. Capital, $100,000. Incorporators: George A. Brockway, Charles S. Pomeroy and Frederick R. Thompson.

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Vol. VII, No. 10 — CONTENTS — October, 1912

Idle Time in Truck Operation—Conditions in New York Delivery 5
Selling a Truck—What is the Best Way? 10
Hiring Motor Trucks 13
Motor Trucks for Army Transportation 14
Truck Statistics 19
Mileage Service Received from Solid Tires—Part III 22
The Editor's Viewpoint 24
Cost of Operating Electric Vehicles 26
Electrics in Denver 28
Fine Hauling Work 29
Facts and Figures Regarding Electrics 30
The Fire Chiefs' Convention at Denver 32
Are Motor Pumping Engines Efficient? 34
Brewery Deliveries 36
Trucks for Produce 37
Wanted—Dealers! 38
Loading at the Side 39
Activities in the Motor Truck World 40
The Gasoline Vehicle 42
Trucks for Mining 43
Trade Conditions Throughout the Country 44
Municipal Service Extensions—Triple Combination 46
Selling Commercial Vehicles on Credit 50
New Commercial Vehicle Models 54
  Krebs Motor Truck 54
  Lauth-Juergens 5-ton 55
  New Willys-Overland 56
  Four Urban Electrics 57
  New Dispatch Truck 58
  A 500-Pound Chase 59
  Best Motor Vehicle 59
  The Service Recorder 60
The Readers' Forum 61
At the 4145th Mile 62
Horsepower and Gear Ratio in Trucks—Part III 64
Trade and Personal Miscellany 66

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The adoption by manufacturers of the **Speedograph** who guarantee their product for time periods will insure them against the mis-use of the truck.

Superintendent Chisholm of the Yellow Taxicab Co., New York City, comments upon the Speedograph as follows;

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The Recording Speedometer Co.
54 Clinton Street, Newark, N. J.

The Autocar

FINLEY ACKER, President of Philadelphia Chamber of Commerce, in a recent address before the Atlantic Waterways Convention, said:

"Every proper effort should be made to provide good roads and to encourage the development of Motor Trucks of maximum efficiency and economy of operation in order that the cost of this INDISPENSABLE FORM OF TRANSPORTATION may be reduced to a minimum."

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Continuous Efficiency Guaranteed

The Commercial Vehicle

Vol. VII October, 1912 No. 10

Idle Time in Truck Operation Conditions in New York Delivery

Actual Time Records Made by Vehicles in the Meat, Milling, Laundry, Brewery, Express and Grocery Businesses Showing Where and How Time Is Lost in Each System

IN order to obtain the greatest efficiency from a motor truck it is absolutely necessary to run it without a single moment's lost time. Valuable minutes are lost daily at loading, delivery, and unloading points which can be saved by a more active application of system and a study of specific conditions.

THE value of the services of a commercial vehicle in a delivery system is limited altogether by the number of trips it can make each day and the number of trips it can make is limited in turn by the amount of time that the truck is standing idle. Where it is a case of a truck having to wait a few minutes before it can be loaded on account of lack of organization in the delivery department or because some other vehicle is at its loading platform, or for any other reason that is not necessary, those few lost minutes mean just so many lost dollars to the firm which owns the truck. **For, although, as some people say, the motor vehicle is not eating anything while it is idle, neither is it earning anything, while its percentage of depreciation and other items of up-keep cost, with the exception of fuel, continue to operate.** Too many firms are prone to adopt horse methods in the operation of motor trucks, never seeming to realize that the commercial vehicle is simply a machine, which does not need a rest but should be kept busy every minute of the working day, in order that the greatest possible return from the heavy initial investment may be realized.

To the prospective purchaser of a motor truck, the idea should be considered as an investment more than in regard to the advertising a smart looking delivery vehicle or a business-like appearing truck, will bring to his business, nor should he feel that the purchase of a commercial vehicle means simply the laying off of one or more of his horse-drawn vehicles. Every department of his business should be reorganized with a view to keeping the vehicle busy. **Different routes should be arranged, different methods of handling the goods in the delivery department may be necessary and the system of getting the goods from the sales department to the delivery department should be so arranged that the minute the truck pulls in to the loading platform it can be loaded in the smallest amount of time and sent out directly.** A motor truck should never have to wait for a horse-drawn vehicle to be loaded, as a horse-drawn vehicle, while also limited in usefulness by the number of trips it can make, has not the heavy initial investment nor so large a percentage of depreciation as the motor vehicle.

Each Delivery System a Different Problem

Different methods of handling goods by motor truck are, of course, necessary in different lines of business, and a careful study of any individual business is essential in order to find in what way a motor truck can be used to the greatest possible advantage. If in any business a commercial motor vehicle is making any number of trips per day but has to wait from 3 to 30 minutes in order to get a load, then the amount of time lost each day could be used in one more trip. If there is no other trip that could be made each day and the truck is handling all of the work expected of it, but still losing from 30 minutes to an hour each day in unnecessary delays, then there is room for an increase in business, which will cause an extra trip each day. Before that extra trip can be taken care of, however, a readjustment of the old schedule is necessary in order to eliminate the lost time.

This Truck Can be Loaded in 10 Minutes from the Chute, Shown in the Upper Right-Hand Corner of the Illustration on the Left, But the Unloading Requires More Time

The Day's Record of a Flour Truck

Trips.	1	2	3	4	5	Totals
Distance, miles, approximately	4	5	5	2-1	7.5	.....
Truck pulled out	.....	.....	1:31	.....	.....	.....
Waited to load	.....	:01	:03	:01	06.5	:11.5
Began loading	8:12	10:36	1 34	3 46–3 57	5:22	.....
Finished loading	8 22	10 44	1 44	3 52–4 06	5.37	.....
Left mill	8 22	10 44	1 44	3 52	5 38	.....
Arrived warehouse	.....	.....	.....	3.57	.....	.....
Left warehouse	.....		.....	4 06		.....
Lost time due to mechanical troubles			.....	.....	.....	
Time lost in traffic	.....	.....	.....	:03	.....	03
Arrived at delivery point	8 53	11:29	2:22	4 21–4:56	6 36	.....
Waited to unload	1 00	:05	.33	01 .01	22	2:02
Began unloading	9 53	11 34	2 55	4 22–4:57	6 58	.....
Finished unloading	10:07	11 45	3 04	4 45–5 03	7 15	.....
Left delivery point	10 07	11 45	3 04	4 45–5 06.5	7.15	.....
Stopped for supper	.....	.....	.....	.....	:32	.....
Arrived mill	10 35	12:30	3.45	5:15 5	8:44	.....
Load number of pieces	70 b'gs	70 b'gs	100 b'gs	28 bgs 30 bls	100 b'gs	398
Load weight pounds	9,800	9,800	10,000	10,850	10,000	50,450
Total amount of time lost	1:00	06	.36	09.5	28.5	2 20
Percentage of loading time lost	....	.10	.33	.11	.45	.....
Percentage of running time lost	100	6	.48	.22	24	.....
Actual running time	59	1 30	1:15	45	1 55	6 22
Total mileage	8	10	10	4 1	15	48

The greatest amount of lost time in the operation of the trucks used by the Hecker-Jones-Jewell Milling Co. is at the delivery points, as is shown in the above table of an average day's work.

It would seem that in some cases a certain schedule might be made out for the truck and a certain inducement offered to the driver and his helper if they beat that schedule. In this way unnecessary delays on the road could be avoided as other time losses besides those in the loading and unloading of the vehicle depend in many cases on the driver and his helper. An arrangement of this kind would, however, be of value only where the driver is absolutely trustworthy, as it might induce him to speed his truck or to take undue risks in traffic.

Actual Trips Made on Motor Trucks

In order to obtain accurate information in regard to the way in which some of the representative firms in different lines of business in New York City were operating their motor trucks, trips were made with six vehicles in use by as many different firms, time records, as nearly as exact as possible, being obtained on each one. Five of these records are shown in the shape of forms, complete records being made.

The first vehicle to be observed was a Packard 3-ton truck owned and operated by Strauss & Adler, meat dealers. This company has two machines, which make deliveries between midnight and 7 or 9 a. m., depending upon the orders received. Each vehicle makes two regular trips each day, and upon the day the notes were taken one of them was chedduled for an extra trip. **The vehicle arrived at the warehouse at 9 a. m. and the driver went to breakfast, from which he returned at 10 o'clock. The loading was not commenced until 10:07 and was finished at 10:49.** During the loading interval the driver oiled and otherwise looked after the truck. The loading of the vehicle was done by hand, three men being employed in the operation. The meat was brought out from the storerooms on carriers suspended from the ceiling and was weighed before before being put on the vehicle. The total weight of the 100 pieces of meat put on the truck was 8,800 pounds, allowing for waste material not counted in when the meat was weighed. The truck left the loading point at 10:55 and arrived at its first delivery point in Washington Market at 11:05, no stops being made on the trip of 1.5 miles on account of the traffic, which, although heavy and consisting for the most part of horse-drawn vehicles, is kept moving. The unloading of the truck was begun immediately upon its arrival, 51 pieces being taken off by hand and carried into the market. Three men were employed in the operation, one handing the meat down from the truck and the others carrying it in. One minute was lost when a workman went to wait on a customer and the other went to feed a horse. The operation was completed at 11:25 and the truck went to another booth, where the remainder of the load was taken off. The vehicle arrived at that point at 11:30 and 5 minutes were spent in waiting to unload as the customer was not ready. The unloading was finished at 11:53, 2 men doing the work by hand. Both of these deliveries were made at sidewalk level. The truck left for the return trip at 11:53, losing 15 seconds in a traffic block, and traffic being heavier than when the first trip was made, 12 minutes were required to make the run.

Forty-two Minutes Could Have Been Saved

In this case, if the truck had been loaded while the driver was at breakfast, 42 minutes could have been saved. Of course, the way in which the driver used the loading time was of value to the owners of the truck, but he could have put half an hour on the vehicle upon his return from the trip and been through earlier as there was no other load going out that day. On the other end of the trip, that is, the delivery points, the loss of time totaled 6 minutes, and the operation of unloading was slow owing to poor facilities.

The delivery superintendent of the Hecker-Jones-Jewell Milling Co. is fully aware of the value of time in commercial vehicle operation and as a result there is a minimum of lost time in the operations at the mill, but there is a great amount of lost time at delivery points where the trucks sometimes have to wait an hour to unload, as will be seen upon referring to the table, which shows one day's work of one of the company's 4-ton Sampson trucks. As the superintendent explained, however, the loss of time at the delivery points is the fault of the customers with whom it would be bad policy to disagree. As the form gives a plain summary of the truck's doings for the day it is necessary only to comment on it here. It will be noted that the average length of time that the truck waited to load was 2.1 minutes, which is very good considering that the driver had to find out each time where he was to load and where the load was to go.

Time Saving Method of Loading the Flour Truck

With the exception of the barrels, which were picked up at the warehouse on the fourth trip, the goods were sent down a chute from the mill into the truck. The barrels were loaded by hand. The unloading was entirely by hand, the driver and his helper performing the operation. On the fourth trip it was necessary to put the goods into the bakers' cellars and they had to be handled twice.

An afternoon trip of the 2-ton Gramm owned by the Star Laundry Co., is also shown in a table. **One reason that the loading took so long at the laundry was because the load was not all ready.** The loss of 4 minutes of the time put down as traffic loss was on account of the opening of a drawbridge which had to be crossed. The other traffic loss was due to traffic blocks in districts in which there were traffic police.

A tabulated record of a trip made by one of the 5-ton General Vehicle electric trucks used by the Jacob Ruppert Brewing Co., is also given, **and it is only necessary to say that the .08 minutes lost in waiting was due to the fact that there was a horse truck at the loading platform.** The trip was through the upper part of the city where traffic is not heavy and there was no lost time due to that cause. The time between the finishing of the loading or the unloading and the time of departure from a point was used by the driver in getting his receipts signed. The driver on the truck did not have any helper and did all the work of loading or unloading by hand, lifting the barrels from the truck to the sidewalk and afterwards putting them into the cellars. It was necessary in some cases to bring up the empty barrels from the cellar before the load could be put in.

An All-day Trip Made With the Express Truck

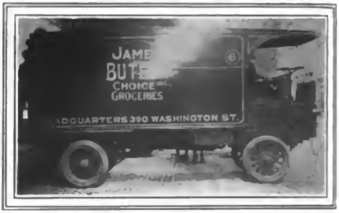
The observations made of the movements of a 3.5-ton General Vehicle electric in the service of the American Express Co. was among the most interesting of these observations. This vehicle is used for fairly long city hauls and occasionally for house-to-house delivery work. In the express business the amount of time lost in waiting for loads depends a great deal on whether or not the trains which bring in the goods are running on time. The hours this truck keeps is from 5:30 a. m. to 5 p. m., the driver and his helper being allowed two hours for lunch time.

Typical Example of Laundry Service

Deliveries	1.	2	3.	4.	Picked Up Load
Distance, miles, approximately	4	3.5	1.5	4	2
Arrived loading point	2 29		......		5:49
Waited to load	01	.....	......		
Began loading	2 30	4 24.5	4 55.5	5:34	5:49
Finished	3 17	4 31	5 06.5	5:35	5:53
Number pieces loaded	150	20	60	2	3
Left laundry	3:26		......	.. ..	....
Time lost in traffic	30 sec.	04	......		
Arrived delivery point	3:43	4 17	4 43	5 32	5:49
Number pieces unloaded	3	90	56	1	
Time required	03	07.5	12	02	
Left delivery point	3:46	4 31	5 06.5	5 35	5:55
Total amount of lost time	10 min. 30 sec	.04	......		...
Actual running time	16 min. 30 sec	14 min	12 min.	25 5	
Percentage of loading time lost	.20	.57	.....	....	
Percentage of running time lost	.62	.28	..		

The Star Laundry Co. commercial vehicle waited only one minute for the first package of the load, but several other minutes were lost in the loading operation as the packages were not ready. On its return trip the truck arrived at the laundry at 6:14.

By Employing the Methods Shown Above, the Loading and Unloading of Cement Can be Done in the Shortest Possible Time. The Load Can be Put on in 10 Minutes and Dumped in One Minute



The Loading of the Laundry and Grocery Truck Is, as Shown Above, Entirely by Hand. There Is an Unnecessary Loss of Time in Loading the Truck in the Case of the Laundry

On the day that the notes were taken the vehicle arrived at the loading depot at 5:30 a. m., and as the train upon which it depended for its load was late the loading was not commenced until 6:15, and some time was lost in the operation because the way in which the goods had been piled after they were unloaded from the train, necessitated their being handled twice in order to get at the pieces which were to go on the truck. The loading was finished at 6:44, the load consisting of 34 boxes of fish weighing on the average about 150 pounds each. The driver and his helper loaded the truck each time. The first load was consigned to Fulton Market, the truck which left the depot at 6:46.5 arriving at the market at 7:26.5, the distance being approximately 5 miles. Only 5 seconds were lost in traffic. The unloading was begun at 7:28 and finished at 7:39, half the load being taken off by the driver and helper and a man from the market. There were three deliveries on this trip, the second being at another booth in the market building, one minute being required to run there from the first delivery point. The unloading was finished at this point at 7:53 and the truck went to its third delivery point around the corner, arriving there at 7:54, and as only one box was taken off at this point, the truck was ready to leave at 7:55, but here as at the end of each loading operation another phase of the express business which results in lost time in the delivery service was encountered; that is, the signing and getting in order of the receipt book. As all three deliveries had to be signed for, it was 8:02 when the truck left the market. The orders were to go to another depot at 65 Broadway and pick up a load. The vehicle arrived at that point at 8:09, but another truck was ahead of it and had the load. The driver telephoned for instructions and was told to go to the Adams Express Co. depot and pick up a load of freight which was coming over their lines straight from Baltimore.

Truck in Grocery Suburban Delivery

Deliveries.	1.	2.	3.	4.	Picked Up Load.	Return Trip	Totals.
Distance, miles, approximately	9.5	1.5	4	3	3	12	33
Arrived loading point	1:35	......	..	......	5:34	....	......
Waited to load	:02	......	......	......	......	....	:02
Began loading	1:37	......	....	......	5:34	....	......
Finished	2:05	......	....	......	5:46	....	......
Number of pieces loaded	158	......	....	......	160	....	318
Load weight, pounds	10,000	......	....	......	2,000	....	12,000
Left loading point	2:13	......	....	......	5:50	....	......
Time lost in traffic	:04	......	....	......	......	:01	:05
Other time loss	......	......	:01	......	......	:04	:05
Arrived delivery point	3:23	3:46	4:16	5:02.5	......	....	......
Number of pieces unloaded	28	13	85	32	......	..	158
Began unloading	3:23	3:46	4:19	5:03	......	....	......
Finished	3:34	3:50	4:38	5:11	......	....	......
Left delivery point	3:36.5	3:53	4:48	5:17.5	......	....	......
Arrived garage	......	......	....	......	......	6:58	......
Total amount of lost time	:06	....	:01	......	......	:02	:12
Actual running time	1:06	:9.5	:22	:12.5	:16.5	1:08	3:14.5
Percentage of loading time lost	.15	......	.4	......	......	.7	.26
Percentage of running time lost	.6	......	.5	......	......	.2	.13

The loss of time between the time of loading or unloading and the time of departure of the James Butler grocery truck is a necessary one but there is another time loss which is not necessary as will be seen upon referring to the above table where a loss of 2 minutes in waiting to load is shown.

Stop for Freight a Total Loss of Time

This trip proved to be a total loss of time as the freight did not arrive. The truck left the downtown depot at 8:17 and arrived at the Adams depot at 8:27, leaving there at 9:46 and arriving at the American depot at 10:13, having lost 45 seconds in traffic. The loading was begun at 10:19 and finished at 10:30, the truck leaving at 10:33 for the Grand Central freight depot. One minute and 20 seconds were lost in a traffic block on the trip and at 10:51 the truck arrived at the unloading point. The distance is approximately 2 miles. The unloading of the 19 pieces of miscellaneous baggage which the vehicle carried was begun at 10:54 and finished at 10:56, the 3 minutes between the time of arrival and the time that unloading was begun being lost on account of a horse truck which was at the unloading platform. There were 7 men employed in the unloading. The truck then went to the other side of the building where it picked up 2 boxes, arriving there at 10:59 and leaving at 11:08. On the return trip to the depot 20 seconds were lost in traffic and the vehicle arrived there at 11:24. The driver had to go to check up his receipts and the loading did not begin until 11:53, no one being on hand to tell the helper what the next load was to be. The loading was finished at 12:01 and the truck left for the house-to-house delivery trip, a record of which is shown in the table.

After the trip was finished the truck returned to the depot arriving there at 3:56 and the unloading of 17 packages being begun at once and finished at 4:00. The driver went to check up his receipts and the helper took the truck to the other end of the platform where he unloaded 12 pieces, beginning at 4:01 and finishing at 4:05. The unloading for the last trip of the day was begun at 4:11 and finished at 4:14, the load consisting of 24 pieces of mixed baggage. The truck left at 4:26 and arrived at the Grand Central freight depot at 4:44, the unloading being begun at once. The operation was finished at 4:48, 34 pieces having been taken off. The truck left for the garage at 4:48, its day's work being finished.

Work Could be Better Systematized

The total amount of time lost in traffic during the day was 2 minutes and 45 seconds, most of this loss occurring in districts where traffic is regulated by the police. Slow speed was necessary in some localities, but time was taken only when a stop was necessary.

In this case it would seem that a large amount of time could be saved at the depot by letting the driver of the truck know immediately upon his return from a trip what the next load would be. In this way the helper could be loading the vehicle while the driver was getting his receipts checked up. It would seem also that the work of checking up the receipts could be made to fit more closely into the loading time so that the driver would have this work finished before the helper had completed the loading of the vehicle. The amount of time lost in waiting for a train is, of course, impossible to avoid to a great extent, but a horse truck might be used for handling the goods which were delayed in this manner.

House-to-House Express Delivery

Stop.	Number of Packages.	Number of Deliveries.	Time of Stop.	Time.
1	1	....	:1.5	12:24.5
2	1	....	:4.5	12:27
3	1	....	:3.5	12:37
4	....	Lunch	:46	12:44
5	1	....	:1.5	1:31.5
6	1	Collect	:5	1:35
7	1	....	:3	1:43
8	1	....	:2	1:49.5
9	1	....	:6	1:54
10	1	Collect	:12.5	2:01.5
11	1	....	:3	2:17
12	1	....	:4	2:25.5
13	1	....	:7	2:31
14	1	....	:2	2:41
15	33	1	:17	2:46
16	2	2	1:8	3:08
17	1	picked up load	:3	3:29
Return trip	....	....	....	3:56

At stop No. 15 the truck had to wait 5 minutes for a horse truck which was at the unloading point. On the next delivery it required 18 minutes to deliver the two packages as the driver and his helper were not familiar with the buildings in which the deliveries were made.

Number of deliveries, 18.

Number of stops, 17.

Actual running time, 1 hour, 35 minutes and 30 seconds.

Number of packages delivered, 48.

Average time per stop, 8 minutes, 10 seconds.

Average time per stop eliminating lunch time, 5 minutes, 49 seconds.

Time lost in traffic, 1 minute.

At stop No. 17 a load of 22 packages was picked up and one delivery was made.

In explanation of the tabulation made of the afternoon trip of the 5-ton Garford vehicle used by the James Butler grocery firm, it should be stated that the amount of time lost between the time that the loading or unloading of the vehicle was finished and the time of departure was necessary to check up the load or the delivery. The delivery superintendent said that there was no way in which this wait could be avoided. It would seem that 158 pieces of miscellaneous groceries could have been loaded on the truck by 4 men in less than the time required, but in view of the fact that the load consisted partly of perishable goods, which had to be packed carefully, the length of time required for the operation was necessary. The load was placed on the truck in the order of delivery. The deliveries were made on Long Island, the third being at Flushing and the fourth at College Point. Just before the truck reached its third delivery point a severe thunderstorm was encountered which caused a loss of one minute on the road and several minutes at the unloading point, as part of the load was perishable and could not be unloaded in the rain. After the fourth delivery had been made it was necessary for the truck to return to its third delivery point and pick up a load of empty boxes. On the return trip it was necessary to stop and light the lights, which took 4 minutes out of the actual running time.

Record of Trip Made in a Brewing Company's Motor Truck

Deliveries	1.	2	3.	Picked Up Loads		4.	Return Trip.	Totals.
Distance, miles	4	.3	.3	.2	.1	1.5	5.5	12.1
Arrived loading point	10:06	....	....	12:37	12:39	....	....	....
Waited to load	:08	....	....	....	....	....	....	....
Began loading	10:14	11:45	....	12:37	12:46	1:03	....	....
Finished	10:19.5	11:46	....	12:38	12:47	1:15	....	....
Number of pieces loaded	50	5	2	4	5	4	....	70
Load weight, pounds	10,000	200	80	160	200	160	....	10,800
Left loading point	10:19.5	12:13	....	12:38	12:49	....	....	....
Arrived delivery point	10:53	11:22.5	12:16	....	....	12:59.5	....	....
Number of pieces unloaded	21	11	12	....	....	6	20	70
Began unloading	10:54	11:26	12:21.5	....	....	1:00	1:56	....
Finished	10:58	11:29	12:34.5	....	....	1:03	1:58	....
Left delivery point	11:19	12:13	12:35	....	....	1:21.5	....	....
Stop for lunch	....	27	....	....	....	....	....	....
Arrived brewery	....	....	....	....	....	....	1:56	....
Total amount of lost time	08	....	....	....	....	....	....	....
Actual running time	:33.5	03.5	:03	:02	:01	:10.5	:34.5	1:28
Percentage of loading time lost	.140	....	....	....	....	....	....	.140
Percentage of running time lost	.24	....	....	....	....	....	....	.24

The Jacob Ruppert Brewing Co. commercial vehicle had to wait 8 minutes for a horse truck to be loaded, as will be seen in the above table. The driver had no helper and consequently loading and unloading was slow.

Selling a Truck—What is the Best Way?

It is a Matter of Opinion Whether Trucks and Pleasure Cars Should Be Sold From Separate Salesrooms By a Separate Sales Force, or Vice Versa—Some Ideas on the Subject From Actual Dealers Are Given Below

THE QUESTION

The following question was sent to the leading motor truck dealers and manufacturers of this country:

If you handle pleasure cars and trucks from the same salesroom do you employ separate salesmen for the truck field, and if so, what class of men have you secured and what are your views on the question of separate salesmen?

THE ANSWERS

40 *replies in all*
26 *in August issue of the Commercial Vehicle.*
34 *use separate selling staffs or favor them.*
6 *use same salesforce.*
12 *use same salesrooms for trucks and pleasure cars.*
2 *use different salesrooms.*

As a rule each manufacturer or dealer treats the problem of selling trucks and pleasure cars from the same salesroom and by means of separate salesmen, in his own way, taking into consideration the facilities he has at hand. Although the majority of them use the same salesroom, it is almost universally conceded that separate selling forces should be used for the different lines. The reasons for this plan seem to be that the truck salesman should have a better knowledge of the construction of the vehicle and should be able to show the customer in what way a truck will be a benefit to his business, being able to deal with and analyze transportation problems, to quote figures on the cost of operation of commercial cars as compared with horse-drawn vehicles and to show the customer what size truck will give the best results in his particular line of business. On the other hand, the reason given as to why a pleasure car salesman cannot sell trucks unless he has special training are that the chief talking points of a motor car with which he is familiar are the silence of the engine, the easy riding qualities of the car and its general appearance and appointments.

Nearly All Makers Have Separate Selling Forces

In the August issue, the COMMERCIAL VEHICLE published twenty-six extracts from letters from prominent manufacturers and dealers all over the country, giving their views on this problem, and out of that number twenty-one either employ separate salesmen or are in favor of it, while only four use the same sales force, their reason for so doing being that their truck business is not big enough to warrant the employment of two selling staffs. The same salesrooms for trucks and pleasure cars are used by nine companies, and one company uses two different salesrooms in the same building.

A Salesroom Devoted Entirely to the Exhibition of Motor Trucks

Since the publication of the August issue fourteen additional expressions of opinion on this subject have been received, the plan of using separate salesmen receiving favorable endorsement from twelve prominent dealers and manufacturers, who use different selling forces or recommend them, and two that did not express any opinion on the subject, as they use the same salesmen for both pleasure and commercial vehicles. The Chicago branch of the Buick Co. not only uses two distinct sales forces for the two lines, but also has its salesrooms in different buildings with a service department devoted to trucks exclusively and separate forms of agency contracts. The different methods follow in detail.

A Salesman Must Specialize

PHILADELPHIA, PA.—I have read the reports of a number of the dealers as published in the COMMERCIAL VEHICLE for August in reference to the subject of separate salesmen for trucks and pleasure cars. I am absolutely sure that after a firm has been through the experience that we have for the past 3 years they will realize that a salesman must specialize, and in order to sell trucks must absolutely know trucks from A to Z and must be able to analyze the prospective buyer's hauling problem or he is liable to sell him the wrong size truck. The truck buyer has to depend largely upon the salesman for his knowledge as to the size of the truck that he requires, and this means constant study on the part of the salesman to handle this large problem properly.

Very few men who buy pleasure cars go into the cost of maintenance and upkeep of the same, while no man thinks of buying a truck until he is thoroughly acquainted with the cost of maintenance and upkeep.

We handle four pleasure cars and five trucks. I have found it absolutely necessary to have separate salesmen on each proposition. I find that pleasure car salesmen cannot handle the truck proposition, and have frequently found that a good truck salesman cannot sell pleasure cars. The main reason for this seems to be that the truck salesman has to have at his finger ends complete data and technical knowledge of the cost and maintenance of trucks, and figures as to comparison with horse-drawn vehicles; whereas the pleasure car salesman, especially on electric cars, does not have to discuss the technical parts of his car. It is my belief that the same salesman cannot sell both lines.—W. H. Metcalf, Woods Electric Garage.—Mais, Walker, Waverley, Detroit and Dayton.

New York City.—We handle all pleasure cars, commercial cars and motor fire apparatus from the same salesrooms, but do not employ the same salesmen for the three different lines. While we do not prohibit, for instance, the pleasure car salesmen from taking a truck order if he can secure it, we expect each man to adhere as closely as possible to the line which he is selling.

We have in a number of cases used former pleasure car salesmen to sell trucks, but have found that as a rule a man who is broken in strictly for truck selling is better than the usual pleasure car salesman. We do not believe that one salesman can properly present a large line of both pleasure and commercial cars, as there is too much to remember regarding his own goods as well as his competitors' goods.—R. T. Alcutt, Knox Automobile Co.—Knox.

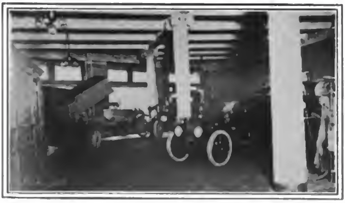
The Line of Argument Is Different

Cincinnati, O.—We believe pleasure cars and trucks should be handled by different salesmen, as the line of argument is different on the two types of cars. If the salesman will specialize and study each individual field separately he will of course become more proficient than if he were to handle both. We endeavor as far as possible to keep them separate, but our salesmen out on truck prospects of course do not overlook any pleasure car customers. The selling of either type requires careful study in order to meet competition and the many arguments that are advanced, especially in selling trucks.—H. V. Ilg, Schact Motor Car Co.—Schact.

Cincinnati, O.—We do not handle pleasure cars, and from our limited experience in the truck business we believe that while the reputation of some pleasure cars has helped the sale of trucks made by the same companies, it takes a different salesman to sell a truck than to sell a pleasure car; the one being commercial and the other a personal deal, both require a different method of handling.—T. A. DuBrul, Miller, DuBrul & Peters Manufacturing Co.—Avery.

Philadelphia, Pa.—For our particular requirements the pleasure car salesmen have been able to take care of both ends of the business. We feel, however, that when motor trucks are handled on a larger scale it is most important to have salesmen devote their entire energy to one line.—E. C. Johnson, E. C. Johnson Co.—Reo.

Pittsburgh, Pa.—I have read with much interest the expression of dealers on the subject of separate selling forces for trucks and pleasure cars, and thoroughly agree with the subject as commented on. I have always believed in separate selling forces for pleasure and commercial cars, as the arguments required in closing up the sale of a pleasure car are entirely foreign to those for the commercial car.



Both Trucks and Pleasure Cars Are on View in This Salesroom

Of course, so far as quality is concerned, either the pleasure or commercial car must be well designed and embody the best quality of material and workmanship, but the pleasure car is sold to a class of people desiring pleasure and comfort, regardless of the after expenses, and practically all people who purchase pleasure cars decide when they secure the car that there will be continual expense associated with the use of the car from the time it is delivered, while the purchaser of a commercial car considers only the economy of operation as compared with horse-drawn vehicles and the proposition of expanding his business by covering more territory and delivering more goods.—C. V. Vestal, Vestal Motor Car Co.—Stevens-Duryea.

Absolutely Necessary to Separate the Salesmen

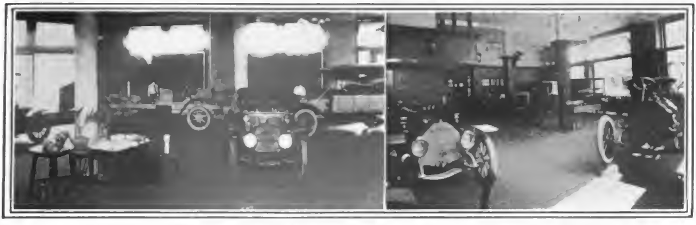
Chicago, Ill.—Ever since the writer has been connected with the Buick Motor Co. the selling division has always been separate and distinct, the pleasure cars having their selling organization and the trucks having theirs. For about a year the salesrooms were located in the same building and after that time were separated, the trucks having a distinct showroom and the pleasure cars being located on Michigan boulevard.

We believe it is absolutely necessary to separate the salesmen and have each one concentrate on his special line of work.

We have recently gone one step further in separating the two lines and are now operating a repair shop for trucks exclusively, the same being on a different floor from the repair department where the pleasure cars are handled.

We have separate agency contracts, and in fact outside of the parts department and bookkeeping department, the two are quite separate with the exception of reporting to the same general manager.—F. N. Stewart, Buick Motor Co.—Buick.

New York City.—In the first place we handle nothing but



Each of These Illustrations Depicts a Salesroom from Whence Trucks and Pleasure Cars Are Sold trucks, and we don't believe that a pleasure car salesman is equipped to sell trucks, nor do we believe that the truck salesman could satisfactorily sell pleasure cars. We believe that each is a separate specialized vehicle.—M. R. Machol, Hydraulic Truck Sales Co.—La France.

New York City.—Would say that we don't handle pleasure cars; our salesmen are truck salesmen only.—F. F. Lewis, Knickerbocker Motor Truck Co.—Knickerbocker.

New York City.—It has been my experience that pleasure car salesmen do not, as a rule, make a success in selling motor trucks. The problem of selling motor trucks is much more complicated and demands more insight into the business of transportation and also more mechanical knowledge. Very often a motor truck salesman is called upon to make comparisons and to give opinions which demand a thorough knowledge of the subject. A pleasure car salesman as a rule must talk more of body design, graceful lines, silence and ease of operation and the beauty of the paint which would not appeal to a motor truck buyer.—P. W. Gaylor, J. Jaccard & Co.—Aries.

Minneapolis, Minn.—We do not believe in combining sales of pleasure cars and trucks, as they are altogether different lines and require different kinds of salesmen. The truck is a business proposition—it needs a salesman who is a thorough business man. The truck proposition requires a man who will devote his entire time to the truck alone. The minute the truck man starts selling touring cars he backslides and is no good on the truck.—G. D. Wilcox, Wilcox Motor Car Co.—Wilcox.

Minneapolis, Minn.—We do handle pleasure cars and trucks from the same salesroom and use the same salesmen. We have never tried separate salesmen for trucks, hence are not able to give a very good opinion as to what the result would be.—P. J. Downes Co.—Gramm.

Medford, Mass.—We handle cars and trucks by same salesmen.—Teel Manufacturing Co.—Teel, Woodworth.

A Good Salesman Ought to Be Able to Sell Both

San Francisco, Cal.—We handle both pleasure cars and trucks. We have several salesmen who devote themselves exclusively to the sale of trucks, but we have found that they occasionally come across good prospects for pleasure vehicles that they turn over to the house. We pay them entirely on a percentage basis, figuring them at 5 per cent. and figuring our gross profit at 20 per cent., so that they get one-quarter of our net. I know the argument that you need a different salesman for trucks than you do for touring cars; that may be true of the majority of salesmen, but if a man is not broad enough to handle the situation for commercial vehicles it is a sure thing that he is not a good salesman of pleasure vehicles, always excepting the society salesman, who at times makes a sale through social connections.—M. L. Rosenfeld.—Auto Sales Co.—Alco, Velie, Page.

Another Salesroom Is Here Shown, In Which Commercial Vehicles and Trucks Alone Are Exhibited for Sale

These Three Trucks in the Service of the Kane & Trainor Ice Co., Sacramento, Cal., Saved Nearly $1,700 in a Year

Motor Trucks for Ice Delivery

THREE KisselKar trucks are owned by the Kane & Trainor Ice Company, Sacramento, Cal., and a record of the performances of one of the trucks has been kept and a comparison made with the record of the "two and a half teams" required to do the same work.

The truck of 3-ton capacity holds 12,600 pounds of ice and is always loaded to its full extent, the number of loads per day averaging six. The average length of haul per day is 20 miles and the truck works for 312 days in a year. Two men were employed, one being paid $4 a day and the other $2.88 a day. The following is a comparison of cost made by the ice company, showing a saving of $1,681.84.

Cost of Ice Delivery with Horse-Drawn Vehicles

Repair two wagons, 12 months		$250.00
Repair one wagon, 6 months		125.00
Six head of horses:		
Four for 12 months, at $15.00	$720.00	
Two for 6 months, at $15.00	180.00	
Two for 6 months, at $7.50	90.00	
		990.00
Depreciation on horses and wagons for year		150.00
Labor:		
Four men at $85.00 for 12 months	$4,080.00	
Two men at $85.00 for 6 months	1,020.00	
		5,100.00
Total cost of horse-drawn vehicles		$6,615.00

Cost of Ice Delivery with Auto Truck.

Total miles traveled, 5,960.86; gasoline used, 1,500 gallons; lubricant used, 188½ gallons; days working, 297 out of a possible 312; tons ice handled, 6,716.2.

Repair and sundries (including complete overhaul)	$1,484.14
Tires	283.92
Labor	2,521.65
Gasoline	228.65
Lubricant	145.05
Depreciation	269.75
Total cost for auto truck	$1,933.16

Chauffeur Association in Cincinnati

THREE hundred and fifty chauffeurs in Cincinnati have joined the new movement here to organize an Ohio Chauffeurs' State Protective Association and local attorneys have drawn up incorporation papers that are expected to form the basis of a state-wide war on the "boy" chauffeur evil. The organization expects to ask the legislature to pass a law making it a felony for a blind person or boy under 12 years to be employed or allowed to drive an automobile in a public highway.

The Motor Truck Industry in Wilmington

TRUCK conditions in Wilmington have been satisfactory, according to dealers, and while no large sales have been made, dealers have been busy demonstrating and are negotiating with probable buyers. The outlook is encouraging. One new motor engine is being constructed for the fire department by the United States Fire Apparatus Co., of Wilmington, and the addition of another is under consideration. Four are now in regular use by the department, in addition to the horse-drawn apparatus. There has been some talk of forming a local motor truck association but it has not assumed definite shape.

Hiring Motor Trucks

The Party Hiring Is Not Responsible for Damage If Ordinary Care Is Taken of the Vehicle

THE law with regard to the matter is simple and is summarised below. The owner must keep the vehicle in proper condition for use to last while it is being hired, but is not bound to make repairs during that period.

THE hiring of a motor truck from the owner creates in law a form of bailment known as *locatio rei*. Where the owner of personal property lets it to another party, who is to pay for the use of it, the contract is for their mutual benefit, which fact is important in determining the rights and liabilities of the parties.

A party who hires a motor truck from another is bound only to take ordinary care of the machine and is not responsible for damage inflicted to the motor truck if ordinary prudence has been exercised while the machine was in his custody as a bailee.

The degree of care, of course, which the hirer of a motor truck should exercise would depend upon all the facts and circumstances of the case, but still it is only ordinary care as the law defines this term which is necessary to be exercised. The hired is bound to render such care in the case as the owner has a right to expect that a man of ordinary capacity and caution would take of the motor truck if it were his own under the same circumstances.

Where a motor truck is hired the bailee, the hirer, is responsible for the negligence of his servant the chauffeur, provided that the negligence took place when the chauffeur was in the discharge of his duty or obeying the commands or instructions of the master, the owner, express or implied.

Must Have a Licensed Chauffeur of Approved Competency

In a recent case, however, in Massachusetts the question is considered of the liability of the owner of a motor truck for the negligence of a driver employed by him where he has let the motor truck with such driver to a third person and such negligent act occurs while the motor truck is so let. In this case the defendants let their vehicle with a licensed chauffeur in charge of it to another for the period of 2 days. The one to whom the machine was let gave orders to the chauffeur as to when and where the car should be driven as one would order the driver of a common vehicle hired by the day or hour, and while the chauffeur was obeying such an order the negligent act occurred, causing the injury complained of. The court considered the analogy between a contract such as this and that of hiring horses, vehicle and a driver, and held that the same principle was controlling in both cases, saying in this connection: "If the defendants had furnished horses, a vehicle and a driver under a similar contract, instead of a motor truck and a driver, there would be no doubt of their liability for the negligence of the driver in the management of the team. The question is whether the same result should be reached upon the facts of this case. The analogy between the two kinds of contract is very close. The management of a motor truck properly can be trusted only to a skilled expert. The law will not permit such a vehicle to be run in the streets except by a licensed chauffeur of approved competency. The danger of great loss of property by the owner, as well as injury to the chauffeur, his servant, is such as to make it of the highest importance that care should be exercised in his interest and that the control and management of the machine should not be given up to the hirer. The reasons for applying this rule in a case like the present are fully as strong as when a carriage and horses are let with a driver."

Where persons have hired a motor truck from one who furnishes the driver, the latter is bound at least to use reasonable and ordinary care to avoid injury to such persons, and to this end he is bound to keep a proper lookout for persons and vehicles upon the street and to have his machine under such control as to avoid collisions.

Where a person who has hired an automobile is injured by the negligence of the driver furnished by the owner, and the injury would not have happened but for such negligence, it is decided that the owner will be liable to the passenger for the injuries received, as where the driver negligently ran near to a street car at a high rate of speed without having his machine under proper control, and without such negligence the accident would not have happened even though the brake rod broke and such breaking had been caused by a latent defect.

The Protection of a Passenger

So a passenger in an automobile for hire, riding beside the driver, was held not guilty of contributory negligence in not warning, advising or directing the driver in cases of emergency or in not attempting to control the acts of the driver.

When not acting within the authority of the employment the owner would not be responsible for an injury to the motor vehicle committed by the chauffeur as a result of his own wilful malice, in which the master took no part.

If a motor truck is lost through theft, or is injured as a result of violence, the hirer is only answerable when imprudence or negligence caused or facilitated the injurious act.

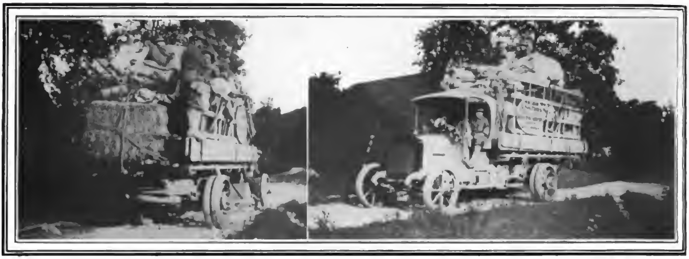
However, where a motor vehicle which is hired out is lost or injured, the hirer is bound to account for such loss or injury. When this is done the proof of negligence or want of due care is thrown upon the bailor, and the hirer is not bound to prove affirmatively that he used reasonable care.

If the hirer of a motor truck should sell it without authority to a third party, the owner or bailor may institute an action of trover against even a bona fide purchaser, one who purchases the machine innocently believing that the hirer had the title and power to sell.

The owner of a motor truck, or the party letting it out, is obliged to deliver the automobile hired in a condition to be used as contemplated by the parties; nor may the owner interfere with the hirer's use of the motor truck while the hirer's interest is in it, or right in it continues. Even if the hirer abuses the motor truck, although the owner may then, as it is said, repossess himself of his property if he can do so peaceably, he may not do so forcibly, but must bring an action. If such misuse of the motor truck terminates the original contract of bailment the owner may demand the motor truck, and, on refusal, bring trover; or, in some cases, he may bring the action of trover without demand.

The Owner Must Let Truck in Proper Condition

The owner of a motor truck who lets it out for a term should keep the vehicle in good order; that is, in proper condition for use; and if expenses are incurred by the hirer for this purpose the owner must repay them. There is some uncertainty on this point, however. The true principle would seem to be that the owner is not bound (unless by special agreement, express or implied by the particular circumstances), to make such repairs as are made necessary by the natural wear and tear of the motor truck in using, or by such accidents as are to be expected, but is bound to provide that the motor truck be in good condition to last during the time for which it is hired, if that can be done by reasonable care, and afterward is liable only for such repairs as are made necessary by unexpected causes.



The Pierce-Arrow 5-Ton Truck Which Did Good Work in the recent Connecticut Army Manoeuvres

Motor Trucks for Army Transportation

Several Points of Discussion Have Arisen Round the Use of Motor Trucks for the Army as a Result of the Work Done by Same During the Recent Army Manoeuvres

THE general opinion of the quartermasters of the various regular regiments and of the regiments of the National Guard is that the army truck will eventually largely supersede the mule, but not wholly so; the solution of the whole problem of army transportation under war conditions is an organized system of truck and mule combination.

LAST month there appeared in THE COMMERCIAL VEHICLE an account of the work done by motor trucks in the recent army manoeuvres in Connecticut. It was seen that the use of the motor truck in these manoeuvres was totally disorganized, that is to say, no effort was made previous to the commencement of field operations to select motor vehicles of a definite capacity and of a definite construction most suited to operate in the narrow lanes of Connecticut. However, in spite of the heavy handicap of unsystematic methods of usage, the trucks came out of the trial with flying colors.

The Truck Must Be in Conjunction with the Mule

The great lesson taught by the manoeuvres in relation to the transportation problem of an army was this: The motor truck must be used in conjunction with the army mule and the combined work must be so systematized and organized as to admit of no loss of time and waste of power. The motor truck must be always at work and must work at its highest efficiency. It can only do this with the assistance of the army mule because when an army is in the field certain ways and lanes are absolutely impassable for even a light truck. In addition there must always be some means of carrying equipment attached permanently to a regiment; a regiment moves but slowly and the motor truck would be wasted for such. The trucks should operate behind the fighting line and should keep up connection between the basis of supply and the distributing depots situated at the front.

Many facts and figures with regard to the operation of motor trucks in the recent army manoeuvres have now come to light. All quartermasters kept careful record of the work done by the trucks attached to their regiments and it is by the examination of such valuable data that the practical utility of the motor truck in army work can be gauged.

According to one quartermaster the great advantage of a truck as compared with mules and horses is its capability of speed on good road, while its chief drawback is that it cannot cross fields with the facility of the mule. He has never experienced any difficulty with regard to horse wagons in their ability to operate over rough ground. Motor trucks should be valuable at base of operation and in the line of communication; that is to say, they should control the service supply up to the head of the line of communication, but not beyond that point. After passing the head of the line of communication army wagons and pack mules would be almost indispensable.

With the 14th Regiment of Brooklyn two motor trucks were used, namely, a Packard 2-ton truck and a Gramm 2-ton truck. Both of these were rented. In addition to trucks there were 52 mules. The trucks did well, making an average speed of 7 miles an hour in a very hilly country. The trucks did about an equal amount of work with the mules. The quartermaster of the regiment considers that the mules are better for hill work. He favors a 3-ton truck which should never be overloaded.

Uselessness of Vehicles Not Designed for Army Service

The motor trucks used by the 7th Infantry, N. G., N. Y. were not at all successful. They were not vehicles designed for army service, being ordinary delivery vans unaccustomed to narrow and weak bridges, but suitable for deliveries in towns and cities. This is only another proof of the great importance of the selection of a suitable truck. Small powerful vehicles of 3000 lb. or less would seem to be the best.

Four trucks were used in the 22d Engineers, N. G., N. Y. Two of these were of 3-ton capacity and two were of 4½-ton capacity, all four being rented. In addition 33 mules were used by the regiment for transportation purposes, tegether with three special army vehicles, such as ambulances, etc. The quartermaster of the regiment states that a small truck is absolutely necessary as the weight of the big trucks is the chief disadvantage of the truck over the horse or mule-drawn vehicle. The average speed of the trucks used was 7 to 10 miles an hour, yet the average daily mileage was only from 15 to 20 miles. Thus it will be seen that the trucks were in reality in active service for only 2 hours out of 24. It is no wonder that under such conditions the truck does not seem a good proposition. The truck is not a thing to look at, it is not an astonishingly beautiful sight; a truck was not built for idleness but for use. It is stated that the trucks in use with this regiment would sometimes sink in the fields after rain or in marshy ground, which was, of course, a great disadvantage. So it may also be presumed that even during those 2 hours per day in which the trucks were in operation that they were not used where they ought to have been used; that is to say, in conveying forage and rations from supply depots to the line of communication at the front. They were evidently used where the mule would have been ample means of transportation. The quartermaster of the regiment agrees with many others that a small truck with plenty of power is the most suitable. The great tendency is to overload and this should be guarded against. The quartermaster's own experience was that everybody tried to get as large a truck as they could, evidently imagining that he that would get the biggest would get the best. They would then proceed to load it so that it would scarcely contain another ounce. The result was that owing to the fact that none of the culverts in the roads were bridged strongly enough to stand such weight, at the first bridge the truck would break through, block the road and hold up the entire train. With a truck suitable for the work and a commonsense way of loading it, it was considered that valuable service would have been done, chiefly owing to the fact that the base of supplies would not necessarily have had to have been so near the fighting line as when mules and horses are used.

A Touring Car Saves the Day

In the 1st Troop of Newark a touring car, the personal property of the captain, saved the day with regard to the hauling of commissary stores. No trucks were deputed to this regiment.

With the 71st Infantry, N. G., N. Y., there were three trucks, one 3½-ton White, a 5-ton and a 6½-ton Saurer, together with twelve mules or horse-drawn vehicles and one ambulance. The advantages of the trucks as compared with mules and horses were found to be great, their chief drawback, however, being their heaviness over country bridges. The trucks operated at an average speed of 10 miles per hour, but only made an average daily mileage of 25 to 40. They did about 50 per cent. of the transportation work and showed their splendid ability to triumph over rough ground, especially so in the case of the Saurer trucks. In the opinion of the quartermaster, motor trucks will eventually supersede mules in army service.

Advantages and Disadvantages of Truck

The following was experienced by the 5th Infantry during the army manoeuvres. One day the depot quartermaster at Danbury attempted to supply the regiment with rations and forage by auto trucks hired in Danbury. One delivery of four truckloads of forage for three brigades was made and practically two-thirds of the forage required was furnished. With one brigade, however, no rations were forthcoming. The trucks broke down and the rations were hauled by four mule teams from Danbury, 14 miles away, the next day. The quartermaster considers that the chief advantages of trucks in such work are as follows: They carry larger loads in less time; less road space is used than with a wagon train; fewer employees are needed; less space is taken in the camp by motor trucks than by wagon trains, in fact, they can remain packed away along the roadside; the camp does not always have to be located, as is always the case with wagon train, near some large supply of water on account of the number of animals; the fuel used by the truck occupies less space and weighs less than the hay and grain required by the animal.

Some disadvantages are as follows: Their capacity is usually figured out for good or fair roads and there are always some bad roads and narrow lanes in country over which campaign is taking place; on a bad road a truck loaded anywhere near its capacity will run the chance of breaking; on a narrow road it cannot move to one side and might frequently block all movement of troops past it, thus forming a serious military obstacle; there is also a great lack of appliances in the field for mending a broken truck as compared with those for repairing a broken-down mule or horse wagon. This latter objection again shows how unprepared the army in the recent manoeuvres was for operating motor trucks in active work.

The great requisites for a motor truck in army work are strength, lightness, simple construction, capability for good speed continually kept up and a good supply of spare parts that can readily replace broken ones.

The quartermaster of the 5th Infantry considers that

A 3½-Ton General Motors Gasoline Truck Loaded, Starting for the Manoeuvres, Escorted by Officer in Touring Car

Three Views of the International Motor Co.'s Trucks Which Took Part in the Army Manœuvres in Connecticut. They Did Excellent Work, but Were Frequently Overloaded to a Great Extent

A Meeting-Place of Two Roads Which Occasioned One of the Longest Delays to the Pierce-Arrow Truck

motor trucks will not entirely supersede the army mule. In a civilized country where there are good roads trucks would be extremely valuable in reducing the extra work placed on the railroads and a great deal also in supplying trains, but it is a correct supposition that in all campaigns there will be places and times where mules will have to be depended upon to get supplies right up to the front line of troops.

Trucks for the Engineer Corps

Two rented trucks were used by the 1st Infantry, N. G., N. Y., and some difficulty was experienced in getting them over hills where the soil was sandy. The best results were obtained from solid tires. The average daily mileage only amounted to about 20 miles and the average speed 12 miles per hour. The trucks only did 25 per cent. of the total transportation work.

With the detachment of the regular United States Engineers one 2-ton Packard was used, rented to the regiment. It had been for about 18 months in general service, hauling cement, coal, etc., in the vicinity of Bridgeport, Conn. In the manoeuvres the truck was used to carry a field zincograph copy press. Much of the work of engineer troops, according to Lieutenant Downing, requires rapid and sure transportation. The officer referred to believes that in compiling road sketches, maps, etc., and in transporting the "sketchers" and their special material, and in moving the zincograph and map reproduction outfits of engineer troops there is an excellent field for motor vehicles. In the summer of 1910 Lieutenant Downing did some mapping and reconnaissance work with a "White Steamer" and since then has tried out motor cycles. He considers, however, that the field of the motor cycle outside its use by messengers, is limited. But special motor trucks might be suitably built for the work and would admirably answer the demands placed upon them. The hired trucks with the 2nd N. Y. Infantry—the 23rd, 47th and 14th Regiments—were all suited to their uses and were all greatly overloaded through apparent necessity, thus proving once more how disorganized the use of motor trucks was in these manoeuvres.

Truck Should Embody Reliability and Simplicity

Lieutenant Downing considers the chief advantages of motor trucks are as follows: Rapidity of transportation; greater length of day's march; utilization of longer routes between camps, thus being able to avoid the enemy or use detours when advisable; economy of men; economy of animals; economy of packing space for supply trains and transportation; economy in alternate use and disuse. The following are among the trucks' disadvantages: Uncertainty as to whether there is going to be a breakdown or not and consequent disorganization; difficulty of engine repairs; tire troubles; inability to operate on bad roads, sandy roads, steep grades. The truck for army work should be built with these considerations always in mind, reliability, strength, simplicity, durability, economy, uniformity, conforming to commercial standards as far as practicable in the endeavor to avoid as far as possible the use of special parts which involve greatly increased difficulty in making repairs.

The captain of the 3rd Infantry observed closely the work of the motor trucks in the Connecticut campaign and in his opinion the time will soon come when they will largely be used for field transportation in the mobile army. He considers that the truck should be about a ton and a half in capacity and should have as much traction surface for the wheels as possible. He believes that the motor truck can be constructed so as to answer all purposes of army transportation unless operations take place in a mountainous country or in the tropics where there are no roads worth mentioning.

The Work of the Pierce-Arrow Truck

A complete record of the work done by a 5-ton Pierce-Arrow worm-driven truck during the army manoeuvres was kept by the driver. It ran from Buffalo to Connecticut, took part in the maneuvres and returned to Buffalo overland.

The truck took the roads as they came. A goodly percentage of the mileage was made over State roads whose condition was good but a large portion of the trips to and from the manoeuvres was made over country roads that could not be boasted of. During the actual manoeuvres back roads were used almost exclusively.

The Pierce-Arrow truck, then, it may be said, went into the manoeuvres prepared for army field work in so far as foresight and engineering experience could equip them.

Most valuable of the extra equipment of the truck were four heavy planks 14 feet long, 12 inches wide and 2 inches thick. Two of these were carried on each side of the truck and there was not a day the truck was on the road that they were not used. Bad culverts were crossed with their aid and they were frequently laid across weak bridges to distribute the strain that would ordinarily fall on a few floor boards and one set of stringers. On one occasion these boards were used by the whole army train of a dozen trucks.

On the left side of the truck a winch was mounted, connecting with the shaft running between the clutch and transmission. The winch was used on two occasions but then as more of a test of its adaptability than as an actual means of propulsion.

Searchlight Mounted on the Dash

Mounted on the dash was a searchlight. This, it was expected, would be employed altogether in lighting the road for night running, but on the first day of the manoeuvres another use was found for it. During the unloading of the truck at night on the field the men had been forced at other times to work with one hand and arm, using the other arm for holding a lantern. With the searchlight turned around to bear on the load, however, the men could use both arms for the work. A spare wheel was carried under the rear of the body.

Many lessons might be learned as to arrangement of supply trains. On one occasion the Pierce-Arrow truck was forced to stop more than fifty times in one day's march. These stops varied in length of time from a few minutes to over 1 hour, the whole day's travel being no greater distance than could have been covered by the truck, if its progress had been unrestricted, in 2 hours at the most.

It was soon observed that bridges and culverts, especially on the back roads, were not built to withstand motor truck passage.

Gasoline Consumption High on Account of Halts

The frequent halts while in train formation, of course made the gasoline consumption much higher during the actual manoeuvres than would have been the case in uninterrupted road work or in commercial work. One fact that worked against fuel economy was that all of the road halts were of indefinite length and the motor would be kept running until it was seen that the delay would be more than momentary. Another factor was the great amount of low gear work on sandy and bad roads and across fields. The difference in army and commercial service is shown by an average mileage of 4.63 miles to the gallon of gasoline on the way from Buffalo to the manœuvres, 4.42 miles to the gallon on the return trip over the roads and of only 2.60 miles to the gallon during the manoeuvres.

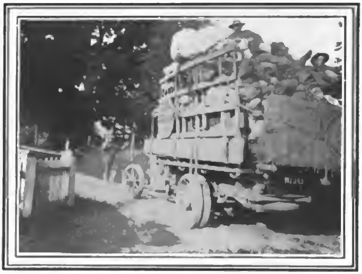
Army trucks to be successful must be especially equipped for their work, as was shown conclusively. Planks are an absolute necessity. In addition to those carried by the Pierce-Arrow truck there could have been used two others 4 feet long, 12 inches wide and 2 inches thick for bridging short spaces.

Among the other recommendations made by an observer were these:

A winch so situated that it may be worked through snatch blocks in any direction; strong eye bolts for carrying snatch blocks for the winch line; two jacks that are quick acting and with a step that is near the ground—an even better plan is a tripod carrying a long extension lever to use for prying; a draw bar that carries an eyebolt or coupling that would prevent wear or cutting of the cable used; a swivel type searchlight; shovels and axes so placed that they are not in the way of the load but where they are accessible for instant use in no matter what position the truck may be thrown; a double block and tackle with 100 feet of rope.

Daily Record of Pierce-Arrow Truck in Manoeuvres

August 9th.—At 9 a. m. we left New Haven for the region of the manoeuvres, and wandered into the camp of the Blue army at Milford.



In Case of Doubt, One of the Men on the Pierce-Arrow Truck Went Ahead and Signaled Measurements to the Driver

No Chances Were Taken on Weak Bridges by the 5-Ton Pierce-Arrow. It Was Due to Special Reinforcing Planks that the Truck Was Able to Make Such Good Time When the Way Was Uninterrupted.

Returning from Milford, we were told that our camp was at Tyler City and here we went, being the first on the field. Here we bivouacked for the night. The truck's rear wheels were run on some planks to keep them from sinking into the soft ground, as the load was still on.

August 10th.—We unloaded completely for the first time and went to New Haven empty to bring back the equipment and men who had come by train. Here we waited from 10.30 a. m. until 7 p. m. without moving a wheel. We finally went to the station and took on a load of about 3 tons, including 15 men. On arriving back at Tyler City about 11.30 p. m. the place had changed from a vacant lot to a congested canvas city and some time was taken in locating our camp, location having been changed to the western extremity. We picked our way through the army wagons, piles of baggage and tents—sometimes having just enough room, and unloaded on our grounds. This only took a few moments as we turned our searchlight around, thus giving the men daylight to work in as well as two arms. Before, one arm was used to hold a lantern.

August 11th.—At 10 o'clock we set out for New Haven with saddles for horses still in that city. Lt. L. M. Gardner and two men accompanied the truck. On our way to New Haven we met a train of army wagons on a narrow road. We pulled out into the bushes and over several large stones to let them pass.

From now on every time the truck made a trip toward the city it carried many passengers, as the soldiers were continually going to and from New Haven, and this morning about 15 or 20 of them helped give us a load of about 3,000 pounds.

At New Haven we filled up with gas, oiled up the clutch, and came back with hay and drinking water and about 10 passengers, making a load of about 3,000 pounds. We covered only 21 miles all day.

August 12th.—The first thing that was done this morning was to pull a truck up a grade on the field. Did not have traction enough. While the engine was warming up the chains were put on, then we went down the grade after the other truck. (It might be said here that the chains attracted much attention from all, especially among truck men, and the easy way in which the chains could be handled was very much admired.

Signal Corps Sending Wireless Messages with Equipment Carried on Sampson 1500-Lb. Truck

Record of Pierce Arrow, 5-ton, Truck in the Connecticut Army Manoeuvres

1. Daily Record During the Army Manoeuvres

Date and Place	Miles	Gallons of Gasoline Put in Tank	Cost of Gasoline	Quarts of Oil	Cost of Oil	Total Cost	Average Load	Loads Carried (approximately)
Aug. 9—Tyler City	12	...	...	...	....	....	8,000	..
Aug. 10—New Haven to Tyler City	23	..	....	...	....	....	6,000	....
Aug. 11—Tyler City to New Haven	21	13.0	$1.95	2	$0.25	$2.20	3,000	....
Aug. 12—Tyler City to Orange Center	20	..	....	....	....	....	6,000	12,000-1 4,000-2 2,000-3
Aug. 13—Orange Center to New Haven	23	15.0	3.00	....	....	3.00	2,000	....
Aug. 14—Orange Center to White Hills	32	10.0	2.00	...	....	2.00	11,000	13,000-1 6,000-2 3,000-3
Aug. 15—New Haven to White Hills	38	12.0	2.40	2	0.25	2.65	2,000	Slight rain
Aug. 16—White Hills to Oxford	30	10.0	2.00	..	..	2.00	14,000	....
Aug. 17—White Hills	11	17.0	3.40		....	3.40	14,000	..
Aug. 18—White Hills to Botsford	14	..		...	....	..	5,000	Rain
Aug. 19—White Hills to Derby	8	12.0	2.40	1	0.13	2.53	2,000	Rain
Total for 11 days	232	89.0	$17.15	5	$0.63	$17.78	6,635	

Miles per gallon 2.6

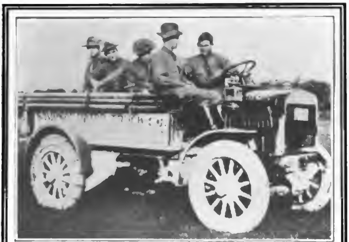
2. Summary of Total Record

Buffalo to New Haven	488	105.5	$17.15	10	$1.39	$18.54	8,000
War Manoeuvres	232	89.0	17.15	5	.63	17.78	6,635
New Haven to Buffalo	508	115.0	19.26	12	1.44	22.50	6,500
Grand Total	1228	309.5	$53.56	27	$3.46	$58.82	7,045

Miles per gallon 3.97.

3. Summary of Results and Notes

Number of days in service	22	Gasoline consumed (gallons)	309
Average load carried (daily)	7045 pounds	Miles per gallon gasoline	3.97
Total distance covered	1228 miles	Oil consumed (27 quarts)	6.75
Average daily mileage	55.8 miles	Miles per gallon oil	182



Wireless Equipment, Tents and Signal Officers on Sampson Truck Ready for Field Service

The camp was moved today to Orange Center, about 5 miles west, and the truck was loaded to capacity. The load had to be adjusted and shifted somewhat, as a great deal of the heavy stuff was put on top and the bottom contained bulky and light weight articles.

They took us to Orange Center by the back way over the country roads. We used our planks on a small bridge which had light stringers and passed over safely. After we were unloaded at Orange City we came back over the same way for remainder of the load, but did not use our planks on the bridge as we were light. The floor of the bridge was level with the road and so we took it as fast as possible, which proved to be lucky, as the bridge collapsed completely and our rear wheels struck with tremendous force on the edge of the road. The impetus was enough to carry us over and more than enough to make the rear end bound about a foot in the air, throwing the men several feet in all directions. No one was hurt in any way but the springs of the truck must have received a terrific strain.

The second load was about 5,000 pounds, and this was taken over another route back to the camp. The roads were better, but extremely hilly and steep. Near camp a wagon came suddenly out of the field and it was necessary to turn suddenly. The wheels struck a boulder of about 400 pounds and moved it out of place nearly 5 inches so that it rolled near the road. The wheels seemed to stand the shock perfectly.

Access to this camp was over a bank at times, but after we went over it a few times it became flattened out and mule wagons began to use it.

The rest of the day was spent in getting water, and we went 2 miles for it and carried back about a ton weight.

August 13th.—We spent the day going after water and wood. The road to New Haven led over a small bridge but rather than trust to the bridge we forded the creek. On getting across we had to put on our chains so as to get up the bank to the road again. Most of our freight this day was passengers to and from New Haven. A truck fell through the above bridge the next day.

August 14th.—About 7 o'clock we commenced to break camp and at 8.30 the truck was loaded during rain to about capacity, and with the extra weight of about 12 men the load reached nearly 6½ ton. After a 20 minute wait on account of the slow movement of the wagon train, it was decided to cut around the train by another road. This carried us about 4 miles out of our way, but we were able to get into the main road to Derby through which we were going. We soon reached the army train and reached Derby about 10 o'clock. Here we waited for the train to come along, as Major Macheneer, who accompanied the truck, did not know where we were going. We fell into line with the outfit of the 71st regiment about 11.30, and from here on it became a slow, tedious trip. At Shelton, just across the river from Derby, the train stopped nearly an hour and a half. Sometimes they would move about 50 feet and then stop 10 minutes or more.

After the train had waited a long time it began to move again and this seemed to be in earnest. However, this did not last long and we were stopped once more, and on turning to the side of the street to allow for public traffic we were just in time to reach a hole that had been filled with soft earth with the surface covered and raked as was the rest of the street. Here we sank nearly to the frame on the right side. This necessitated moving most of the load and we soon jacked and pried the wheel out. We were not able to try the winch as there was nothing to tie to. Fortunately we did not delay the train and we had lost no time as the train did not move a foot until we were almost ready to go on. We were here nearly 1½ hours, making the total delay in Shelton about 3 hours.

From here on we stopped and started and followed the country road up into the White Hills, making steep ascents at times. A 3-ton truck followed us and used our planks on the bridges and culverts.

At 8 o'clock we reached Beardsley's farm, White Hills, on which we were to camp, having traveled 9 miles in 10 hours.

Went at once to our location and unloaded, which took about 20 minutes. We then returned to Orange Center, accompanied by Lieutenant Gardner and piloted by Major McCarthy in a Pierce-Arrow 48.

On going toward Derby we were blocked by another truck which was unable to make the hill, so we hitched on and pulled it up to the level ground.

We arrived in Orange Center about 11.30 p. m., then making a detour on account of a broken bridge made by the truck which had followed us above. We returned with about 3 tons at 1 o'clock the following morning.

August 15th.—About 9 o'clock we took three men back to Orange Center, where some of the horses were still stationed. As usual, we had our customary load of passengers—about 15 or 20 men. We loaded up with provisions at the Commissary at Derby and returned to Beardsley's Camp at White Hills about 6.30 p. m.

As water was scarce all hands (15 men) loaded everything that would carry water into the truck and we started out about 8 p. m. to find water. Three or four miles were covered around the hills but nothing good to drink could be found, so we went to Derby where we filled up at the nearest house where there was a pipe line.

August 16th.—This was to be the hardest day and so it proved. The army trains went over one route and the trucks were to follow another. The truck train was led by the Pierce-Arrow with 7 tons and in its wake came seven of other makes. We left camp about 8.45 a. m. and started for Derby. Here we waited for another truck but it never showed up, so we continued on our way up the east side of the river toward Zoars Bridge. After getting about a mile out of Derby we again waited for about an hour for another truck and then continued on at 12 o'clock.

This road was very sandy, narrow and hilly. The planks were used twice and the whole train ran over them. In one very sandy spot we sank nearly 12 inches. This was made without skid chains but on first speed. After leaving this stretch and climbing a hill the truck was thrown suddenly over on its left side, dangerously near the side of the road where there was a drop of about 15 feet. At the time most of the men had taken the road and only a few were riding. These slid off the top and did not stop until they reached the bottom of the cliff but were not hurt. The trouble was due to a weak culvert, or race under the road. This was covered with flat stone about 5 feet high and 5 feet wide. We had pushed two or three of these stones through, the right one catching a little and thereby throwing the truck to the left. The high load then helped us to lay on our side as far as the body floor would permit. The entire load was taken off and the truck was then lifted up bodily by utilising the strength of 20 men, so that planks could be put under the hub of the wheel. The winch was then tried and planking the wheels so that they would catch, the motor was started and we walked out. This delayed us from 1.45 to 2.45, when we were ready to start. While we were loading another gang of men filled up the hole with rocks and laid logs over them. By covering this with dirt the road was made as good as new. A mile further on we came to a very bad bridge and were making arrangements for strengthening it, when orders were received to return to Derby and go to Oxford. At this time a photographer showed up and took some pictures of the truck while the others were turning around, thus making us last in line.

When we reached the sand stretch about 8.30 we found three trucks stuck. It was only by shoveling their way out that they got through. The main path was blocked so we had to go to the side and by using some of our planks, three men to a plank, and we used four, and removing some of our top load, we had no trouble in getting over.

We reached Derby at 10.45 and here we found the rest of the train, which had put up for the night. We ate a lunch, took on some gasoline and continued to Sandy Hook over a good road. We arrived at a poor bridge just beyond Oxford and here we camped for the night.

August 17th.—It was decided now to go back to White Hills and get things in shape to go back to Buffalo, as the maneuvers would be over this day and consequently would not need any of the load carried. About 5.30 a. m. we started for Derby, and as we entered we met the rest of the trucks just going out. We waited in Derby until we received orders and then made White Hills about 1 p. m.

August 18th.—The truck was loaded with personal and cavalry baggage to be shipped to Buffalo. This morning it was raining hard and clouds were low. The truck, which always stood out in the weather, was covered with water. We left camp at 12 o'clock and at 2 p. m. reached Botsford, a distance of about 8 miles, after going over some very bad roads—muddy and with steep hills. The chains were used and sometimes planks had to be laid to keep from sinking into the soft ground. On returning, the road was blocked by a truck. Its motor was not working well and the rear wheels did not get traction enough to get over the short, steep hills. When we were able to pass them, which was no easy task on account of the soft ground and narrow road, we gave them a tow to level ground. We reached camp about 6 p. m.

August 19th.—About 9.30 a trip was made to Derby freight house with about a ton of goods to be shipped, and while in Derby we took on gasoline so as to start for Buffalo in the morning. It was impossible to start then on account of the rain.

August 20th.—We left the White Hills for home about 8.30 a. m., with about 6,500 pounds.

Truck Statistics

Tables Prepared by the N. A. A. M. Showing the Distribution of Motor Trucks Throughout the States

NEW YORK State tops the list with regard to number, and miles of paved street in cities of 30,000 and up; Indiana ranks first in miles of improved roads.

THE National Ass'n of Automobile Mfrs. has issued several remarkably useful and valuable tables showing the present state of the motor truck industry in the United States. The geographical distribution of trucks is given in relation to population and good roads, together with the standing of the various states with regard to the number of trucks in use in each respective state, and the percentage results of the relation of motor trucks to population and good roads. It is seen that New York tops the list with regard to the number of commercial vehicles in use in 1912, followed by Pennsylvania, Illinois, California, Massachusetts, Ohio, Michigan, New Jersey, all of which have over 1,000 in use. Nineteen states have between 100 and 1,000, whilst the remaining 22 states have from between 21 and 100. These figures are not in strict accordance with the number of the population in each state. Texas, Georgia, Kentucky, Tennessee, Alabama, Missouri should all be within the 1,000 limit. California, Michigan and New Jersey are above the average if a comparison is made between populations.

It will be seen from Table 1 that New York, Pennsylvania, Illinois, California, Massachusetts, Ohio and Missouri lead with regard to the number of miles of paved streets in cities of 30,000 and upward. Missouri thus ought to be ahead of Michigan, New Jersey, Indiana and Minnesota with regard to the number of commercial vehicles used.

The figures with regard to New York are interesting. The premier city leads with regard to number of commercial vehicles in use, population, in total and per square mile, population in cities of 25,000 and upward, miles of improved country roads and miles of paved streets in cities.

Indiana Ranks First in Improved Roads

The most densely populated state per square mile is the District of Columbia, where there are 218 motor vehicles in operation. Indiana ranks first in the number of miles of improved roads.

Examination of these figures furnish many illuminating lines of thought with regard to the operation of motor trucks in this country. Manufacturers and dealers should subject each state to a most careful examination and the very best point to start out on such an examination is the comparison of motor trucks in use with the number of miles of good roads both in country and town.

One of the principal considerations governing the motorization of the delivery department of any business is the condition of the roads on which the delivery vehicles are to operate. Since 1909 municipal authorities have been busy in repairing country roads throughout the whole country to meet with the new conditions of delivery and highway traveling. It will be seen from Table 1 that Indiana and Ohio are both very far in advance of any other state in this connection. Nearly 25,000 miles of improved country roads have been made since 1909 in each state. New York has been pretty active in this connection, also Wisconsin and Kentucky. The mountainous states of Colorado, Nebraska

Tables Prepared by N. A. A. M., With Regard to the Distribution of Motor Trucks.

TABLE 1—SHOWING RELATION OF DISTRIBUTION OF MOTOR TRUCKS TO POPULATION AND GOOD ROADS

TABLE 2—SHOWING STANDING OF STATES IN NUMBER OF MOTOR TRUCKS, POPULATION AND MILES OF GOOD ROAD

TABLE 3—PERCENTAGES SHOWING RELATION OF MOTOR TRUCKS TO POPULATION AND GOOD ROADS

State.	Number of Commercial Motor Vehicles In Use in 1912.	Population of State in 1910.	Population per Square Mile.	Population in Cities of 25,000 and Upwards.	Miles of Improved Country Roads in 1909.	Miles of Paved Streets in Cities of 30,000 and Up in 1907.	Rank in Number of Motor Trucks.	Rank in Total Population.	Rank in Population per Square Mile.	Rank in Population in Cities of 25,000 and Up.	Rank in Miles of Improved Roads.	Rank in Miles of Paved Streets in Cities of 30,000 and Up.	Per Cent. of Trucks to Each 1,000 of Population.	Per Cent. of Population in Cities of 25,000 and Up.	Per Cent. of Improved Country Roads to Total Roads.	Per Cent. of Paved Streets in Cities of 30,000 and Up.
New York	7,892	9,113,000	191	6,355,280	12,787	2,952	1	1	6	1	3	1	86.6	71	16.13	54
Pennsylvania	2,664	7,665,000	171	3,015,161	3,365	2,154	2	2	7	2	18	2	34.7	39.3	3.84	55
Illinois	2,551	5,638,000	101	2,624,656	8,914	1,947	3	3	11	3	6	3	45.2	47	9.47	38
California	2,198	2,377,000	15	1,095,120	8,587	1,066	4	12	36	7	7	7	92.5	47	17.87	50
Massachusetts	2,045	3,366,000	419	2,155,475	8,463	1,912	5	6	3	4	8	4	60.7	65	49	61
Ohio	1,171	4,767,000	117	1,784,210	24,106	1,643	6	4	9	5	2	5	24.5	35	27.13	50
Michigan	1,146	2,810,000	49	939,929	6,900	687	7	8	18	9	9	8	40.8	30.7	10	46
New Jersey	1,080	2,537,000	338	1,368,927	3,377	687	8	11	4	6	17	9	42.5	54	22.76	56
Indiana	970	2,760,000	75	479,071	24,955	482	9	9	12	14	1	13	36	17	36.7	42
Minnesota	970	2,076,000	26	594,618	5,417	326	10	19	30	10	11	18	46.7	28.6	6.83	17
Missouri	812	3,293,000	48	1,080,087	4,755	1,119	11	7	19	8	14	6	25.3	32.8	4.4	54
Iowa	730	2,225,000	40	330,092	2,505	253	12	15	25	21	24	21	32.8	16	2.45	19
Wisconsin	580	2,333,000	42	592,885	10,167	590	13	13	23	11	4	10	24.8	25	6.64	56
Oregon	526	673,000	7	207,214	2,799	292	14	35	42	27	21	20	78.1	30	9.49	37
Connecticut	519	1,115,000	231	484,034	3,030	389	15	31	5	13	20	15	46.5	45	24.08	50
Rhode Island	410	543,000	508	367,851	1,042	377	16	38	2	17	31	11	75.5	68	49.14	80
Texas	382	3,897,000	15	473,375	4,892	358	17	5	37	15	13	16	9.8	12	3.8	26
Maryland	371	1,295,000	130	558,485	2,142	506	18	27	8	12	26	11	28.6	43	12.77	92
Colorado	239	799,000	8	286,854	320	118	19	32	39	25	40	28	30	36	1.08	8
Nebraska	220	1,192,000	15.5	194,328	249	167	20	29	35	28	43	26	18.3	16	.31	24
Dist. of Columbia	218	331,000	5,518	331,069	. . .	325	21	43	1	20	..	19	65.8	100	.....	72
Utah	181	373,000	4.5	118,357	1,018	14	22	41	43	30	32	38	48.5	32	12.23	4
Washington	170	1,142,000	17	450,153	4,520	170	23	30	34	16	15	25	14.8	41.5	13.19	6.7
Georgia	155	2,609,000	44	301,608	5,978	249	24	10	22	23	10	22	5.9	11.5	7.27	48
Kentucky	146	2,290,000	57	352,607	10,114	354	25	14	13	19	5	17	6.3	11	18.82	64
Kansas	120	1,691,000	21	178,465	374	122	26	22	33	29	36	27	7.9	10.5	.38	16
Virginia	100	2,062,000	51	292,638	1,903	191	27	20	15	24	27	24	4.8	15	4.38	61
North Carolina	96	2,206,000	45	59,762	2,313	...	28	16	21	39	25	..	4.3	2.7	4.79	.
South Dakota	96	584,000	8	......	286	..	29	36	40	..	41	..	16.4	....	.5	..
Florida	83	753,000	14	95,481	1,752	54	30	33	38	33	28	32	11	12.5	9.97	40
Maine	78	712,000	25	109,421	2,703	115	31	34	31	31	22	30	10.5	14.7	10.59	80
Delaware	78	202,000	103	87,411	186	59	32	47	10	35	44	31	38	43.2	6.22	63
Tennessee	78	2,185,000	52	322,419	5,353	427	33	17	14	22	12	14	3.5	14.7	11.66	46
South Carolina	54	1,515,000	50	85,152	3,534	36	34	26	17	36	16	34	3.5	5.5	11.02	51
Arkansas	51	1,574,000	30	69,919	1,085	25	35	25	29	38	30	37	1.2	3	2.97	13
Alabama	48	2,138,000	42	222,342	3,264	118	36	18	24	26	19	29	2.2	10	6.58	22
New Hampshire	48	431,000	48	96,068	1,448	29	37	39	20	32	29	36	11.1	22.2	9.58	14
North Dakota	46	577,000	8	......	140	...	38	37	41	..	45	..	8	....	.23	..
Louisiana	44	1,656,000	36.5	367,090	329	222	39	24	28	18	39	23	2.6	22	1.32	41
Oklahoma	42	1,657,000	24	89,483	361	40	40	23	32	34	37	33	2.5	5.5	.5	17
Mississippi	36	1,797,000	39	......	342	.	41	21	26	..	38	..	2	....	.86	.
Montana	34	376,000	3	39,165	95	3	42	40	45	40	17	39	9.4	10.4	.41	3
Vermont	34	356,000	39	......	2,650	...	43	42	27	..	23	..	9.5	....	18.4	.
West Virginia	32	1,221,000	51	72,802	591	32	44	28	16	37	33	35	2.6	6	1.84	50
New Mexico	29	327,000	3	......	104	...	45	44	46	..	46	..	8.9	....	.61	
Wyoming	28	146,000	1.5	......	416	...	46	48	48	..	35	.	19.1	....	3.94	
Nevada	26	82,000	.7	......	46	...	47	49	49	.	48	..	31.7	....	.36	..
Idaho	22	326,000	4	......	510.5	...	48	45	44	..	34		6.7	....	2.77	
Arizona	21	204,000	2	......	273	...	49	46	47		42		10.3	....	4.56	

and Montana do not show good figures in this connection.

The industries prevailing in each of course greatly influence delivery by motor truck. South Dakota, for instance, has no big cities and is a state of seasons. The practically non-manufacturing states of Arizona, Idaho, Nevada and Wyoming fall naturally to the bottom of the list with regard to the number of trucks used.

Massachusetts and Rhode Island stand highest with regard to the percentage of improved country roads to total roads and this really is the standpoint from which the highway improvement work in each state should be viewed. New York's percentage should be higher, and the same remark refers to Illinois, Pennsylvania and Texas.

Every dealer should analyze these tables with great care. Every figure is pregnant with suggestions for new markets. The tables may be taken as absolutely reliable guides to the motor truck industry in each state.

Article Published by N. A. A. M. on Above Statistics.

The controlling factors in the geographical distribution of motor trucks are somewhat complex. Interesting results have been obtained in an effort to trace some of the principal factors, as shown in the accompanying tables.

It has been said that the motor truck is essentially a good roads proposition and consequently an attempt was first made to show a direct relation between the number of commercial motor vehicles in each of the States and the total mileage of good roads in the States. The result indicated that some other factor had a greater influence on distribution. It was assumed that this must be population, and therefore the total population of the States and the population of each State per square mile were compared with the number of trucks in each State. The result was better this time, but still not up to expectations. Hence the conclusion was reached that, as large cities are known to be the centers of motor trucking, there must be a closer relation between the number of trucks in a State and the number of people living in large cities in the State.

This was found to be the case, but an ever closer relation is shown between the number of trucks and the number of miles of paved streets in such cities, so that the final conclusion is that the use of trucks is dependent in greatest degree upon the number of people living in large cities and the condition of the streets in such cities. It is evident, however, that there are still other influences having important effects, such as the temperament and occupations of the people and the degree of prosperity of the communities.

Referring to Table 1, the figures relating to the vehicles in use were compiled by The Commercial Vehicle from three principal sources of information—production as reported directly by manufacturers to March 1, 1912, State and city registrations of motor vehicles, and reports of trucks in use in the principal cities by reliable observers and well-informed persons. These figures show a total of nearly 30,000 commercial vehicles in use, which correspond fairly closely with the results of the statistical investigation into production and sale made by the National Association, and are believed to be the most reliable figures available showing the distribution of trucks by States.

The population figures and percentages were taken from the United States Census report for 1910. The mileages of improved roads and the percentage of improved roads to total miles of roads in the various States are from a report for the year 1909 by the United States Office of Public Roads and relates solely to country roads that have been graded, drained and hard surfaced or treated with some preparation. The mileages of paved streets in cities of 30,000 population and upward are from the Census report of 1907, the figures for 1909 being now in course of preparation and not yet available.

Examination of Table 1 shows that, while New York State, which heads the list with 7,892 trucks, has the largest total population, the largest population in cities of 25,000 and up, and also the largest mileage of paved streets in cities of 30,000 and up, it has an average of only 191 persons per square mile as compared with 508 in Rhode Island, 419 in Massachusetts and 338 in New Jersey, and has only 12,787 miles of improved country roads against 24,955 miles in Indiana, 24,106 in Ohio and more than 10,000 miles each in Wisconsin and Kentucky. On the other hand, California, which ranks fourth with 2,198 trucks, stands twelfth as regards total population, with 2,377,000, and numbers only 15 persons per square mile, but nearly one-half its population lives in cities of 25,000 or more, and it stands seventh in miles of improved country roads and miles of paved city streets. Again, Texas, with a population of 3,897,000 and 4,896 miles of good roads, is credited with only 382 trucks, whereas on these two factors alone it should have more than Missouri, with her 832 trucks. But, on examination it will be seen that only 473,375 of her great population live in cities of any size and that there are only 358 miles of paved streets in those cities, while practically one-third of Missouri's people live in cities and the cities have 1,119 miles of paved streets.

In order to render such comparison easier, Table 2 has been prepared. This shows the rank or standing of each State in each of the factors mentioned, and it is necessary only to follow across the line after each State to determine whether it has its full quota of trucks in proportion to population and good roads and streets. Examination will show, as already stated, that the most direct relation is found between the rank in actual number of trucks and the rank in population in cities and the paved streets in the cities; that is, between columns one, four and six.

Thus, it appears that those States having a normal quota of trucks, or in which the distribution is about uniform with city population and street paving, are New York, Pennsylvania, Illinois, Massachusetts, Ohio, Michigan, Connecticut, Rhode Island, Texas, Georgia, Maine, South Carolina, Montana, New Mexico, Nevada, Washington and Delaware.

Those States having an excess of trucks above normal are California, Indiana, Nebraska, Utah, Iowa, Oregon, Kansas, Arkansas and Florida.

Those having deficiencies are New Jersey, Missouri, Washington, Maryland, Kentucky, Virginia, West Virginia, Tennessee, Alabama, New Hampshire, Louisiana and Oklahoma.

Evidently, local conditions affect the situation in most of the abnormal States. Take Tennessee, for example. It has less than two-thirds as many trucks as it should have to be on a basis with the normal States. This may be accountable for on the ground of comparative backwardness in industrial and commercial progress or because the field has not been cultivated sufficiently by the truck manufacturers' agents. Louisiana is another instance, due perhaps to temperamental and industrial factors. Where blanks occur in the fourth and sixth columns they indicate that there are no cities in those States having 25,000 population in 1910.

The percentages in Table 3 show almost the same results as the relative standing in the States on the basis of actual numbers in Table 2. In explanation of this table, California has 92½ per cent. of one motor truck to each 1,000 inhabitants, giving it the largest number of trucks to population. Forty-seven per cent. of her people live in cities of 25,000 and up, giving her fifth place in this respect. Of her total road mileage, nearly 18 per cent. has been improved, and just half of the street mileage in cities of 30,000 and up had been paved up to the year 1907. Louisiana has an average of less than one truck to 37,000 inhabitants, as compared with nearly one truck to 1,000 in California.

Another remarkably interesting table prepared by the N. A. A. M., reproduced herewith, is that showing load rating and the chassis weights of motor trucks, including both gasoline and electric vehicles. These figures give the actual weight of American motor truck chassis of various capacity rating supplied by 325 manufacturers of gasoline and electric trucks. A curve has also been prepared, depicted in the accompanying chart, which shows the relation of chassis to rated capacity. Thus in an electric vehicle, if the chassis weighs 4,000 pounds, the rated capacity should be 2,300. In a gasoline vehicle with chassis weighing 4,000 pounds the capacity would be 3,500. The dots shown on the chart indicate the average actual weights in the capacities most numerously represented.

It should be remembered that the weight of the body is an important point in this problem.

Load Rating and Chassis Weights of Trucks

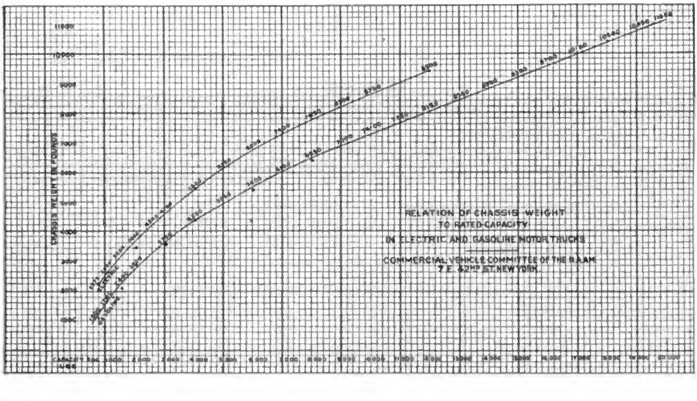
GASOLINE VEHICLES

Capacity rating (pounds)	No. of models reported on	Average actual chassis weight (pounds)	Means of all chassis weights (pounds)	Average weight or 3 to 10 leading makes (pounds)
500-800	11	1221	1300	1373
1000	23	1786	1780	1728
1200	10	1880	2000	....
1500	34	2190	2400	2331
2000	46	2986	2900	3230
3000	30	3727	3750	3536
4000	44	4505	4500	4721
5000	4	5125	5050	5233
6000	49	5509	5600	6070
7000	10	6080	6100	6100
8000	16	6423	6550	6500
9000	3	6381	7000	....
10000	32	7603	7400	8232
11000	1	7800	7750	....
12000	4	7920	8150	....
13000	3	8966	8550	....
14000	2	8700	8900	8700
15000	..	....	9300	....
18000	..	....	10500	....
20000	3	11240	11250	9860
	325			

ELECTRIC VEHICLES

Capacity rating (pounds)	No. of models reported on	Average actual chassis weight (pounds)	Means of all chassis weights (pounds)	Average weight or 3 to 10 leading makes (pounds)
500-800	7	2375	2375	2540
1000	11	2755	2750	2700
1500	3	3518	3300	3350
2000	7	3525	3800	3716
2500	4	4270	4300	....
3000	2	4142	4750	....
4000	6	5592	5600	5439
5000	..	....	6250	....
6000	1	7000	6900	7000
7000	4	7439	7400	7851
8000	..	....	7850	....
10000	3	8438	8700	8438
12000	1	10000	9500	....
	49			

Chart Showing Relation of Chassis Weight to Rated Capacity of Trucks



Mileage Service Received from Solid Tires

Further Opinions of Leading Truck Manufacturers and Dealers on the Subject —Actual Figures of Tire Service—Who Is to Blame for Unsatisfactory Results?—Part III

IN previous issues the subjects of the guarantee of service for solid tires given by makers, truck manufacturers' experiences of solid tire wear and commercial vehicle tires in England have been dealt with. The letters from truck makers printed last month showed that many truck owners are not satisfied with the mileage they get from solid tires; the following letters on the same subject substantiate this statement.

PHILADELPHIA, PA.—It is not advantageous nor easy to state what mileage we get from our tires, as we use all kinds of tires and as a rule we have no difficulty in getting an average of 6,000 to 8,000 miles from a set on a ton and a half capacity car. We think about 50 per cent. of the service that our cars are giving is confined within the city and the balance of the service is taken up in outlying districts within a radius of twenty-five to forty miles of Philadelphia in all directions. Some of the roads that our cars travel over are good and some are indifferent.—P. Prouty, Autocar Service Co.—Autocar.

Better Mileage with Better Pavements

CHICAGO, ILL.—Our truck owners get from 8,000 to 10,000 miles per tire. We think they would get a larger mileage with better pavements, less overloading and less speeding. We cannot give you any data on the matter of mileage service received from solid tires.—Francis L. Thomas, Franklin Automobile Co.—Franklin.

BALTIMORE, MD.—For city delivery we use horses, but for suburban points we use Franklin automobiles of one-half ton capacity with pneumatic tires. The roads over which they travel are mostly macadamized and each car averages about 40 miles per day. The tires average about 6,000 miles. We have never used solid tires and are, therefore, not in a position to give any information along this line.—Hutzler Brothers.

SAN FRANCISCO, CAL.—It is a very serious question, about rubber tires on trucks. We have all kinds of trouble with tires to replace; sometimes we get only 500 miles out of a set of rubber tires. It is not the truck's or driver's fault, it is the rubber company's fault, because they do not put the right kind of goods in them. On a good many tires we get as much as 6,000 to 8,000 miles. We are pretty well satisfied with the rubber companies for backing up their guarantees. It is a good deal to do with bad streets, overspeeding and overloading that they do not get the mileage out of the tires on their commercial vehicles.—Paul Kleiber, Kleiber Co. —Gramm.

American Tires Not As Good As Foreign

CHICAGO, ILL.—The tire question in this country seems to be a very big bone of contention and I believe it is due to several causes.

I do not believe the quality of the American made tires is as good as the genuine foreign made product. I am of the opinion that one serious fault with the American made solid tire is that it is made entirely too hard. A softer tire would be much more resilient and would protect the mechanism of the car to a greater extent and would not flake or chip so easily.

I do not think the foreign tire is subjected to the hard usage given the American tire. European roads are better and better judgment is used on the part of the foreign driver in the handling of his car.—F. W. Arbogast, Studebaker Corporation.—Studebaker.

MINNEAPOLIS, MINN.—We know that many truck owners are not satisfied with the mileage they get out of solid rubber tires. But to the writer's mind 75 per cent. of their troubles are occasioned by the operator more than it is on account of the roads, pavements, etc. The writer has watched the truck drivers in this city for a number of years and 90 per cent. do not have their company's best interest at heart in regard to expense. If they had to assume a share of their troubles it would result in a much greater efficiency of mileage. The average automobile and truck driver will rush his car or truck through as though he were pressed for time and at the end of the journey or trip will fool away hours of which if 25 per cent. had been used in making the trip with less speed it would have been a saving to him or to his employer. We would put causes of loss of mileage on tires in order named: First, careless driving and overspeeding; second, overloading; third, poor pavements. If owners of trucks would have the driver assume more responsibility the upkeep would be greatly reduced.—J. M. Oston, Avery Co.—Avery.

12,000 to 15,000 Miles From One Set

CHICAGO, ILL.—The tire mileage proposition is a very indefinite one, as we get very little information from owners of Packard trucks as to their mileage, although we do have some information in respect to certain makes of tires which is to the effect that the owners are receiving from 12,000 to 15,000 miles wear on one set.—F. E. Parker, Packard Motor Car Co.—Packard.

ST. LOUIS, MO.—Tire mileage is to our mind a serious problem in connection with the introduction of trucks. While it is undoubtedly a fact that American road conditions are to a large extent responsible for the bad showing there are many other contributory conditions which it is possible to control, such as carelessness on the part of drivers, negligence on the part of operatives whose duty it is to attend to resetting, etc., when such is indicated, and bad practice, wilful or otherwise, on the part of the manufacturers.

Below you will find a few definite figures, the accuracy of which we can vouch for:

These trucks received hard service.

No. 1—2-ton 2½-inch Dual (rear) ran....	4,398 miles.
" 2— " " " " "	3,535 "
" 3— " " " " "	3,366 "
" 4— " " " " "	3,757 "
" 5—1-ton 3½-inch single " "	7,125 "

These trucks received normal service:

No. 1—2-ton 2½-inch Dual (rear) ran.... 5,310 miles.
" 2— " " " " " .... 4,856 "

These last still in service.—C. E. Michel, Union Electric Light & Power Co.—General Vehicle.

New York City.—In advancing the question of tire mileage you state that the European trucks average 30,000 to 40,000 miles on one set of tires. These figures are at least 60 per cent. too high. Rubber tires abroad average from 10,000 to 15,000 miles—very seldom more.

This was the chief reason why the Aries Automobile Co., after 9 years' experience with rubber tires, determined to construct its tires of steel, thus insuring to purchasers a far more satisfactory investment, overcoming the very obstacles which you make a point of in this question. To-day Aries trucks are constructed as follows:

1½-ton—All rubber tires.
3-ton—Rubber tires front, steel tires rear.
4-ton—Rubber tires front, steel tires rear.
5-ton—Steel tires both front and rear.
7-ton—Steel tires both front and rear.

Steel Tires Superior to Rubber

Aries steel tires are guaranteed to last for 60,000 miles. This, however, does not indicate the wearing qualities of the tire, as we have been furnished with figures showing that many sets of tires have traveled 80,000 miles and over. The character or quality of the road makes no difference when steel tires are used.

A truck owner of Porto Rico advised recently that a 7-ton Aries truck had been steadily carrying 10 to 12-ton loads over rough roads for 5 months and that this truck, purchased late in November, had paid for itself by the middle of April.

Simply as a matter of comparison, permit me to state here that rubber tires in Porto Rico seldom average more than 2 or 3 months wear.

Conclusive evidence of the superiority of steel tires over rubber was produced through the extremely difficult tests to which the Aries tires were submitted by the various European powers. To-day they have been adopted, approved and subsidized by the armies of France, Germany, Spain, Austria, Russia and Japan.

In pushing sales of the Aries steel-shod trucks in the United States we have encountered one phase of the tire question which may prove particularly interesting. From time to time we receive requests from truck owners to quote prices on Aries steel tires to replace rubber tires. Our reply in every case is the same, regardless of the make of the truck—no motor vehicle, unless especially constructed, is adapted to the use of steel tires. Therefore we most positively advise against their being used on any trucks except on Aries trucks.

To begin with, the resiliency or protection against vibration derived from rubber tires on other trucks is built into the springs and other protective parts of the Aries. For instance, the Aries has:

a—25 per cent. fewer parts than the ordinary truck.
b—Steel construction where aluminum is regularly used by others.
c—Three-point suspension instead of four-point, making shaft alignment positive.
d—Bearings 30 per cent. larger.

By test we find that this generous construction plan has resulted in the Aries 5-ton and 7-ton trucks, equipped with all steel tires, show from 20 to 23 per cent. less vibration than the usual rubber tired vehicle.—J. Jaccard, J. Jaccard & Co.—Aries.

New York City.—Would say that we have had very good luck, if you might call it that, on our 3-ton truck. We have been able to average a little better than 10,000 miles on rear tires and about 18,000 on front tires. We think this is due to the fact that we use a governor and also a light high-grade spring with supplementary coil which allows the truck to ride easy when empty.—F. F. Lewis, Knickerbocker Motor Truck Co.—Knickerbocker.

Road and Street Conditions are to Blame.

New York City.—The question of rubber tires on motor trucks is, of course, the greatest drawback to the industry to-day, and in our road and street conditions the fault will be found. Also a great many manufacturers may be criticized for selling cars which are under-tired, paying too little attention to the weight of the car and body and load to be carried on these tires. Personally I have known a few cases where tires have exceeded the guaranteed mileage. Of course the tire companies as a rule will stand back of their guarantees and make replacements and allowances, but this is always a source of annoyance to the motor truck owner, not to mention the delay in installation.—P. W. Gaylor, J. Jaccard & Co.—Aries.

Minneapolis, Minn.—We are all of us somewhat disappointed on the mileage received. In a number of cases a set of tires has lasted for 15,000 and even 18,000 miles, but the general rule is between 8,000 and 12,000 miles.—G. D. Wilcox, Wilcox Motor Car Co.—Wilcox.

New York City.—We agree with you that the tire mileage is not as great in this country as in Europe on account of poor pavements, overloading and overspeeding. The overloading can be partly eliminated by insisting upon the owners requiring their drivers to turn in daily reports stating the exact loads they have carried and giving the automobile manufacturer the privilege of examining those reports any time he wishes to do so. Overspeeding can be corrected to a certain extent by one or two methods: either by putting on a governor which cannot be tampered with and which will limit the motor to a certain speed or putting on a recording instrument which can be kept locked and which will indicate the maximum speed.—R. T. Alcutt, Knox Automobile Co.—Knox.

Philadelphia, Pa.—The tire question is a very ticklish one at the present time, and we do not particularly care to make any comments on the subject. Our customers are obtaining fairly good results from tires, many of them averaging 15 to 18 months' service.—W. W. White, General Vehicle Co.—General Vehicle.

Tendency of Manufacturers to Undertire Vehicles

Philadelphia, Pa.—The average life of tires on our vehicles is fully 10,000 miles. This is less than is obtained in Europe, due, we believe, to very poor city pavements, inasmuch as it is impossible, except on down grades, to overspeed our cars, which are all of the electric type. We believe that better tire mileage would be obtained, even in spite of the poor paving conditions encountered in this country, were it not for the tendency of manufacturers to undertire vehicles.—E. S. Hare, Commercial Truck Co.—Commercial.

Cincinnati, O.—We have no examples of tire mileage worked out to such an extent as would be valuable in answering this question. The writer has personally seen some streets in Europe as bad as some streets in America and has seen some American streets as good as some European streets. On the whole, European cities are probably better paved, and the paving is better cared for, and this without question assists materially in not only getting a longer tire mileage, but also in minimizing other expenses of upkeep.—T. A. DuBrul, Miller, DuBrul & Peters Manufacturing Co.—Avery.

Chicago, Ill.—Our guarantee on solid tire equipment is from 6,000 to 8,000 miles and Little Giant cars of former models have been run as much as 18,000 miles without tire replacements under the ordinary road conditions.—W. W. Bishop, Chicago Pneumatic Tool Co.—Little Giant.

THE EDITOR'S VIEWPOINT

THE FIELD OF THE ELECTRIC

THE development of the electric commercial vehicle field can be measured by the development of battery equipment for these vehicles. On all hands the public recognizes the simplicity of the electric truck from an operative viewpoint and in the same breath they acknowledge its limitations for long-distance work.

Battery interests are awake to the situation: They are awake to the fact that greater activity than ever is needed because of the country-wide energy that is being put into the gasoline trucks by scores of reputable makers. They are striving to meet these conditions by making batteries more vibration proof, more enduring and lighter. Some interests are specially aggressive in this work, others should co-operate; the united energies of all are needed in the work.

Municipalities with populations reaching into the millions, with great street congestion and with anti-noise organizations springing up, are going to demand the reduction of noise, just as Scotland Yard in London took the bull by the horns and made the street motor buses install chain-driven gearboxes and worm-driven or bevel-driven rear axles. A campaign of this calibre will be opened in three or four of the big American cities within the next 5 years. At present the electric vehicle, speaking as a whole, has a lead on its gasoline brother in this field, but here again the gasoline makers are alive to the situation. Some have adopted worm drive, others bevel gear drive, others are enclosing the chains and all because the matter of reducing noise is receiving attention. The movement is in its embryotic stages, it has on its swaddling garments, but it will grow and when development starts it will begin with a rush.

Electric current producing companies, generally known as central station interests, have in many cities been slow to realize the value of boosting the commercial vehicle industry by reducing rates and making other conducive terms to the truck owners and makers. Within the last two or three years there has been an awakening in the big cities but the smaller cities in a score of states are holding out for high rates. Makers of electric trucks should take this matter up of securing a reduction in current cost in these cities and also the establishment of just current rates for garages where considerable charging is being done. A few of the truck makers have complained of the lack of co-operation of the electric current producers in these smaller cities. The influence of the central stations in large centers can be brought to bear upon these smaller cousins with good results. The need is pressing in several cities. The electric vehicle makers can solicit the co-operation of the central station interests in this work.

TRUCKS IN THE MINING INDUSTRY

THE mining fields of Arizona, Montana, Nevada and other Western states offer one of the most fertile markets for motor transportation; already many of the leading mining corporations in Arizona have relegated the time-honored mule to oblivion and substituted the motor truck. The motor ore wagon is now an acknowledged part of the modern mining equipment.

Motor trucks have been adopted by these leaders in the mining industry because they save dollars and cents by using them as compared with using mule power. Not only are dollars and cents saved, but time is saved and time is the biggest factor in modern industry. You can go further, and besides saving dollars and time there is the increased field of activity, made possible by greater speed in delivery from the mine to depot or smelter.

At first the miner received the truck with skepticism. Then the truck was weighed and often found wanting. Then the truck maker was not sufficiently familiar with the requirements of mining zones. The engines in the trucks of five years ago could not be compared in robustness with those of today. So it was with the running gear, the gearset, the spring suspension and the bodies. Today it is all changed. The truck has made good.

Nearly all the trucks in use at the mines have dumping bodies. There is little demand for any other kind of a truck, since nine-tenths of the freight handled is ore, coal and coke. In a few isolated instances trucks with ordinary bodies are used for the transportation of provisions and other supplies, but as a rule the purchaser prefers to buy a machine that he can use for freighting ore if necessary. The mining man does not care for any truck that cannot carry a load of at least 5 tons and he demands at least a 30-horsepower engine.

Recently a test was made on the famous Fish Creek hill, between Phoenix and the Roosevelt dam, to test the relative efficiency of the mule team and the motor truck. From the bottom to the top of the hill is 1.75 miles and the average grade is to per cent. It took an eight-mule team 7 hours to haul a 5-ton load up that grade. A truck took the same load up in 18 minutes.

Near Tucson a smelting company uses motor trucks to transport ore from the mine to the smelter. The distance from the mine to the plant is 5 miles and each truck makes six trips a day, with a load of 6 tons. The transportation cost is 75 cents a ton. When mules and wagons were used the cost was from $1.50 to $2.00 a ton.

The truck is doing its part in creating good roads sentiment in the mining states. Mining men who own property that cannot be reached by wagon or truck are demanding better roads in order that they can get machinery to their claims and market their ore.

MOTOR FIRE-FIGHTING APPARATUS

THE great point to be considered when equipping a fire department with fire-fighting apparatus is not minimum cost but greatest efficiency of such apparatus. Proofs have now been furnished on all sides of the almost perfect efficiency of all motor fire apparatus. The motor can be used as a driving force for the wagon, and as a pumping force for the water. As to the first, there is absolutely no question of the superior service that a motor-driven piece of apparatus can render in comparison with horse-drawn apparatus. In addition to being practically four times as fast, the money saved in cost of operation and maintenance will in 3 years' time or thereabouts save the initial cost of an expensive motor machine. With regard to the motor as a pumping power, tests have been made for the last year or two, and there has seemed in many cases something lacking in order to place the motor above steam as a pumping power, and so to eliminate the steam fire engine. Now, however, the motor as a pumping force seems coming into its own: engineers have devoted a great deal of time and labor to the perfection of the motor fire engine, and gradually, one by one, weaknesses are being eradicated, and improvements are being added, one by one, all alike bidding for efficiency, constant dependability and simplicity.

It is pleasant to any fire department to find that after having secured the most efficient fire-fighting machine on the market, cost is being decreased every day while the new machine is in use. The figures shown in the last issue of THE COMMERCIAL VEHICLE are ample proof of the immense saving in total expenses when motor apparatus replaces horse apparatus.

The most economical piece of apparatus for a small town, determined eventually to motorize the whole of its fire department, seems to be the triple combination engine. This is a splendid machine for testing the efficiency of motor fire apparatus before making a complete change in a department. In a few months' time, figures are forthcoming from all directions—with regard to work accomplished, with regard to cost of maintenance and operation saved, and with regard to superior quickness in reaching a fire—and all point to the fact that the days of horse-drawn fire apparatus are numbered. It is now only a question of time for the complete motorization of every fire department in the United States, because, firstly, each fire department wants to be thoroughly efficient, and secondly, each fire department wants to extend the field of operations with the least cost of upkeep and operation.

From reports received from practically every fire department throughout the country it is found that in nearly every case a certain sum of money has been laid by by the municipal authorities for the express purpose of purchasing motor fire apparatus for the department; in all cases, it is the opinion of the chief engineer that the motorization of the fire department should be begun at once, and if a sum has not yet been set apart for this matter it is either because of the lack of adequate funds or the incompetency of the municipal body. In no case is it due to the shortsightedness of the head of the fire department;one and all recognize in motor fire apparatus the fire fighting apparatus of the future, the *only* apparatus that will give the highest percentage of safety against fire.

THE LOADING AND UNLOADING PROBLEM

THE operations of loading and unloading are the links that connect internal system with external system. Let us suppose that a big retail store has elaborately organized its internal delivery system to correspond with the efficiency of a fine fleet of motor vehicles; let us suppose also that not a jot of time is lost from the moment the goods are ordered till the time they are packed and addressed, ready for delivery. Internal system does this; and external system delivers the goods with the least possible delay. So far so good. But suppose the connecting link is weak! Many and many a time are alleys in big cities, similar unto those into which most loading platforms abut, congested and rendered almost impassable by a string of horse vehicles, motor trucks, light delivery wagons, all waiting for their turn. And if they have to wait for their turn, so also will the goods have to wait on the loading platforms for their respective delivery wagons. Consequently, internal system is wasted, external celerity of delivery is of no avail; the two systems are unable to meet and, unified, produce the requisite model delivery.

This is not an imaginary supposition. Every minute a delivery wagon waits in idleness, is actual loss of money. Systems are useless when loading facilities are nil. The motor vehicle is a particular sort of person. He must have method and methods must be worked on time, otherwise he refuses to be efficient. The motor vehicle is mechanical; then methods, facilities, arrangements must be mechanical. There must be no hitch. All must be kept lubricated with the oil of constant habit.

Loading platforms should be constructed in a common sense manner. Before installing a motor delivery system, let the merchant, wholesaler or retailer look to his loading facilities. They may have done very well for horses, horses like rest, in fact they *must* have it, but to a motor truck rest is an anti-existence. Let the merchant draw a plan on careful measurements; he must time his delivery system so that there must be no congestion even at the busiest hour of the day; if he finds that someone else's loading platforms get in the way, then he must negotiate with that person, and point out to him in a tactful manner how much better for both certain modifications would be; if argument fails, then he had far better construct new platforms in another part of the building than attempt to work motor vehicles from loading places that at any time may be hampered.

Another point that has to be considered is: How many men shall I employ to load each wagon? Will this depend on the load, the time of day, the district for which the goods are bound, the time for which they are wanted, the position of the loading platform in relation to the vehicle? Of course it will, and the answer to such a question will depend on a host of similar points, all allied as factors in delivery efficiency. Such points must be focused to one single point, and that single point is "get the motor started as soon as possible."

The loading platform is the link of two systems; it has a big influence on both. Therefore, it is advisable that before perfecting either internal or external systems one should ascertain that the link is strong and supple and capable of expansion. Otherwise there will have to be reconstruction of systems to fit the link, whereas the position ought to be construction of the link to fit the systems.

Cost of Operating Electric Vehicles

Cost Depends on Conditions of Operation and Various Ways of Charging and Storing the Vehicle, Also Upon the Number of Vehicles in Operation, As With Many Individual Expense Is Less

THE cost of maintaining and operating an electric vehicle in the service of a big florist in New York City amounts to nearly $1,350 per annum, whereas in the case of an express company the annual total costs is very much higher. These figures show how very largely cost is dependent on the nature of the business and not so much on the nature of the vehicle as is often thought to be the case.

IN computing the cost of electric commercial vehicles there are different ways of providing for the storage and charging of the vehicles that must be taken into consideration as well as the manner in which they are taken care of and run and the conditions under which they operate. If the loads the trucks carry are heavy and the streets over which the vehicles run are in poor condition, the tire cost is apt to be great. The cost of tire equipment depends also upon whether or not the vehicle is speeded and what care the driver exercises in applying the brakes in stopping.

Some users of electric trucks have arrangements with their garage men whereby a certain amount covers all expenses of charging, lubrication and washing, as well as storage. In other cases the user has his own garage and his own power plant. He also employs his own mechanics who make all the repairs necessary. Another user may have his own garage but have the electric current required for charging the vehicle supplied by an outside electric company.

The painting of the body and frame of the vehicle also is done in different ways by different firms who use electric commercial vehicles.

A Fleet of Electrics Owned by R. H. Macy Co., the Well-Known Department Store of New York City

A Studebaker Electric Vehicle in the Service of Geo. Ehret's Hell Gate Brewery, New York City

Cost Depends Largely on Nature of Business

The nature of the business in which the electric trucks are used also plays an important part in the compilation of cost figures for the vehicles. The resiliency of the load carried has a great influence upon the cost and the percentage allowed for depreciation, it being a well-known fact that a ton of feathers will ride much more easily than a ton of iron, as the feathers will readily absorb the jolts and shocks which would otherwise be taken up by the various parts of the vehicle.

Another item dependent upon the nature of the business in which the truck is being used is the number of miles it has to cover each day, upon which depends the frequency with which it has to be charged. In some firms which use electric vehicles the driver and his helper are required to wear uniforms. Again some business houses pay their drivers and helpers higher wages than others, which makes a big difference in the totals of the cost of electric delivery service.

In some cases two kinds of insurance have to be carried, liability and fire insurance. The rates of insurance differ frequently according to the place in which the truck is stored and through what districts it has to travel in its daily work.

Hard To Obtain Cost Figures

As a rule it is very hard to obtain actual cost figures on the operation and maintenance of electric or any other kind of vehicles. The owners decline to give them out when they have them and in most cases no record is kept of the cost of the vehicles. Every item goes into the paid out column of the general ledger and consequently the average merchant does not know at the end of the year whether or not he is saving money by the use of motor driven vehicles. In some of these cases he does not care to know perhaps how much the vehicles cost him as he feels that perhaps they have been more expensive than they should have been. This is, to say the least, unbusinesslike, for the cost of operation of commercial vehicles should be fully recorded in a separate form or ledger so that the merchant may be sure whether or not he should purchase additional motor vehicle equipment and how much he can spare for this addition to his delivery service. Another advantage of the keeping of cost records is that the merchant, especially if he has various types of vehicles in service, can judge to a great extent for himself the type of vehicle best suited to his requirements and will make no mistakes in purchasing a new truck.

Actual figures for the cost of operation and maintenance of electric commercial vehicles were obtainable in only two lines of business, a florist furnishing one set and an express company the other. The florist said that his vehicle had been in service over ten years and that if he had figured a percentage of depreciation on it he would be owing it a good sized sum. The percentage of depreciation in a commercial vehicle is an intangible quantity, but it is something that is always present and always operating. It would seem, however, that in the case of a truck which had been in service a long time, the percentage of depreciation is largely taken up by the repairs to the truck, which is given a new lease of life with every repair. It would seem also that where repair bills are taken into consideration, depreciation should be figured at a low percentage, for the same reason.

Cost of Maintaining a Florist's Electric

A table showing the cost of operation and maintenance of the florist's vehicle, which has a capacity of 1,000 pounds and is used in the delivery of very light loads, sometimes consisting of only one or two pieces, is given below:

Storage, including charging and oil	$ 115.50
Repairs	172.75
Driver's and helper's salaries	366.00
Uniforms	46.00
Fire insurance	87.50
Liability insurance	116.62
Tires	28.08
Overhauling	197.00
Bevel glass for body	2.50
Battery solution	21.12
Painting	103.50
Total	$1,346.57

These figures are for the period of time between the first of January and the latter part of July.

It must be remembered that this vehicle is a very old one and consequently the repair bills and overhauling charges are very heavy. The truck was in commission only up to the middle of April, when it was sent to be overhauled. The busiest time of the year in the florist business is between Christmas and Easter, and it is only during this time that the vehicle is run, being put into the merchant's stable for storage until needed again. The vehicle was removed from the garage, where it is stored when in operation, about the middle of April, which accounts for the low figure given for storage.

Cost of Maintaining An Express Co.'s Vehicle

Below is given a table showing the average cost of an electric commercial vehicle in the service of an express company. These figures were obtained from the total cost of maintaining and operating a large number of electric trucks and cover a period of one year.

Initial investment	$4,000.00
Depreciation at 10 per cent	400.00
Interest at 4 per cent	160.00
Liability insurance	100.00
Fire insurance	190.00
Driver	850.00
Battery repairs and renewals	380.00
Tires	375.00
Miscellaneous repairs	160.00
Current	400.00
Lubricants	9.00
Washer	32.75
Battery man	146.00
Assistant	65.00
Rent	200.00
Total	$7,467.75

The express business is an altogether different proposition from the florist business, in that the load is greater and the work more severe. The item of uniforms does not enter into the expenses of maintaining a commercial vehicle in the express business, nor does in this case the salary of a helper for the driver. On the other hand, the tire wear is greater in this business than it is in the florist business.

This company maintains a garage and charging station of its own, as will be seen upon referring to the above table, which shows the average salary paid to the battery man and his assistant for attending to the charging of one truck for the year. The electric current is not generated at the garage, but is supplied by an electric company from outside.

One of the New Electrics That Have Recently Been Installed by the United Electric Co., Springfield, Mass., in the Place of Horse Wagons.

Cost of Electrics in an Electric Light Co.

THE United Electric Light Co., of Springfield, Mass., recently determined to eliminate all its horse-drawn vehicles and substitute in their place electrics. A thorough trial has been made with three 3000-pound Detroits. Careful records of operating and maintenance costs have been kept. The company has now thoroughly satisfied itself that the electric vehicle for the special work required is the most economical and serviceable.

The electricity for the machine has been supplied by the company's plant, and to be on the safe side with regard to cost the company has charged the machines 6 cents a kilowatt, which is twice the amount usually charged customers.

The cost per mile for all charges amounted to 5 cents. With horse-drawn vehicles the cost per mile for all charges amounted to over 8 cents.

As a consequence of this big difference in cost the company has decided to get rid of fourteen horses and eleven wagons, with all equipment. The value of the horses is estimated, on an average of $200 a horse, at $2800. The wagons are valued, at an average of $175 apiece, at $1,925. The harness that has been in use is worth about $40 a set, or $560 in all. Thus, adding the three sums, it is found that the total value of the horse equipment that is to be sold amounts to $5,285.

A garage completely equipped for the care of the electric vehicles is to be built for the company. It is estimated that only one man will be necessary to look after the machine, whereas in the case of the horses and wagons in the stables three men have been necessary. This will mean a saving of $1,800 a year on the salaries of the two men who will no longer be needed.

The horse vehicles have covered a distance of 10 miles a day. The electric vehicles which have been tested have covered a distance of 20 miles a day.

The machines which are being purchased are different makes, four of these being already ordered, namely, one 5-ton car from the General Vehicle Co., one 2-ton car from the same company, a 2-ton car from the General Motors Co., and a 750-pound Walker. The company will also buy a 3-ton Couple Gear, a lightweight Baker and a lightweight Bailey.

During the testing of the three Detroits the machines have been subjected to a monthly examination by experts, who have seen that the cars have been run on tip-top condition They have been set to run at a speed of 15 miles per hour.

Electric Trucks Used by the Knight-Campbell Music Co. and the Daniels & Fisher Stores Co., Both of Denver. Their Use Has Occasioned a Great Saving and a High Standard of Efficiency Has Resulted.

Electrics in Denver

Very Successfully Used in a General Store, a Dry Goods Co., a Music Co., and a Bakery

OWNERS give some valuable figures with regard to cost of operation and comparison with horse-drawn vehicles. The electric vehicle is considered to be splendid for city delivery work in many different kinds of service.

THE following users of electric vehicles in Denver were recently interviewed with regard to their experience with electric vehicles and the cost of operating the same:

The Daniels & Fisher Stores Co., the Joslin Dry Goods Co., Knight Campbell Music Co., Senter Pie Co. and the Macklem Baking Co. Each of these firms is a leader in its particular line of business and all of the five were thoroughly satisfied with the electric vehicle as a delivery medium.

Saving of 1½ Cents Per Package

The Daniels & Fisher Stores Co. have had two 1000-pound electrics made in Detroit and Fritchle in operation since last November. They have given admirable service since that date. During the two weeks before Christmas in a severely cold period the vehicles rendered excellent service. Each machine has replaced 1½ horses and does considerably more work. The cost per package has also decreased. With horse wagons it cost the company about 4½c. to deliver each package; with electric it now only costs 3c. per package. There is consequently a saving of 1½c. on each package. Another big advantage is their cleanliness, the manager of the company considering that electrics are the cleanest equipment for his business. They are also particularly adapted to a delivery system where the stops are frequent, as is the case with this firm. The electrics are used for deliveries within a distance of 4 or 5 miles from the store, and they travel from 35 to 40 miles a day.

The company has had for some time the idea in mind of investing in more machines, but at present they have to wear out the large equipment they have of horses and wagons. The latter are perfectly good, although they are unable to accomplish the work done by the electric vehicles.

The upkeep costs of the vehicles amount to a very small total. The charges for renewals of parts, tires, current, painting once a year, etc., amount to $90 a month for two machines. This, however, is a fixed charge made up by a local garage and includes all attention and garage charges for the machine.

The Knight Campbell Music Co., before investigating the merits of electric vehicles, had been having its piano moving done by a contracting firm; the cost of this, however, was heavy. In October, 1911, a 1-ton General Vehicle machine was installed and it has been operating every day since, Mr. Campbell being very enthusiastic about it and now considering the purchase of another one. One great advantage is that it is able to deliver many small articles such as piano stools, phonograph records and other music store merchandise formerly carried by an express company at a cost of $50 a month.

Electric Saves $100 a Month

The cost of operating the machine has been considerably below the expectation of the owner. During the first month this was in use the machine saved the company $100. The cost of current is scarcely worth mentioning. The machine has been giving on an average 30 miles a day, but it is capable of covering a far greater distance. One day it went 55 miles and even then the batteries were not exhausted. Mr. Campbell considers that there is no foundation in the opinion that an electric machine is unable to cover a large amount of ground. He believes that with an additional machine he will be able to decrease materially a $120 monthly expense cost for transporting small articles.

The Joslin Company are very well satisfied with their machine, after service of a little over a year. It has been covering from 35 to 55 miles a day. It is a 2000-pound Waverley.

The Senter Pie Co. does an extensive business in downtown restaurants and grocery stores and operates a 1000-pound Studebaker electric vehicle, which has been in service 33 months. The cost of operation is very small and it does more and better work than any other piece of the firm's delivery equipment. During the time it has been in operation the total cost for replacements and repairs of all kinds has been $50, with the exception of $200 for battery; this is the only other expense outside of current incurred. The cost of electricity is exceedingly small. To get an idea of the cheapness of running the electric it should be compared with the cost of running a small gasoline runabout which is used by the same firm for emergency deliveries. This costs over five times as much to operate as does the electric vehicle.

As soon as the present equipment of the company is worn out its place will be taken by electric vehicles. It may be mentioned here that the present electric vehicle owned by the company, although rated at 1000 pounds, often carried 1500 pounds. The proprietor of the firm is confident that with a larger set of batteries the machine would be able to carry a load 1000 pounds in excess of the car's rated capacity without danger of mishap to goods or machine. The complete absence of any odor, grease and dirt renders the electric an ideal delivery vehicle for any firm engaged in the bakery or pie business or any other business in which food products are handled.

The Macklem Baking Co.'s business is confined to restaurants and groceries in the downtown districts, and it is for delivery to these that the electric vehicle in the service of the company is used. The machine is a 2000-pound Studebaker. Here again the frequency of the stops in the firm's delivery service renders the electric the ideal machine for such transportation. The cost of current is exceedingly small, about 40c. worth of electricity being used each day. The machine has been in use for a little over 2 years and during that period the only heavy item of expense incurred has been the replacement of a steering gear, the original steering gear being a little too light for the vehicle. Replacement of tires has cost practically nothing, and the only other cost has been for repairs of minor importance. The machine during the night is kept right in the bakery. Once a week it is washed and oiled.

The manager of the company considers that the electric vehicle is the best machine he can have for delivery purposes in his business. It can be stopped instantly and is always ready to start on the instant. This has been a big factor in saving time and money for the business. The owner likes it because it saves money; the driver says he would be unable to do the work without it.

Los Angeles Motor Fire Engines

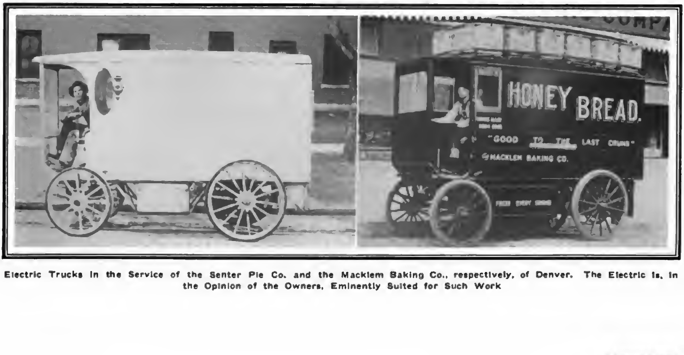
THE fire department of Los Angeles, Cal., sent a motor-drawn engine and hose cart, as well as the fire chief in his special automobile, to aid in extinguishing a big fire recently. Although the fire was 18 miles away, the fire equipment reached the scene in about half an hour and aided in saving the residential portion of the resort. Horse-drawn engines would have been useless in such an emergency. Two were loaded on Pacific Electric flatcars and sent through with all possible speed, but arrived too late. This is another demonstration of the value of motor fire equipment for widely scattered cities.

Fine Hauling Work

Remarkable Performance of a General Electric 6-Ton Truck Which Displaced Fourteen Horses

TRUCK hauls a steel girder weighing 35 tons, two other motor trucks and tackle, total weight being about 40 tons, across West Avenue bridge over canal.

A REMARKABLE performance of the motor truck was that in Rochester recently, when a General Electric motor truck 6 tons' carrying capacity, hauled across the West Avenue bridge over the Erie Canal, a steel girder weighing 35 tons, two other motor trucks and tackle, total weight being about 40 tons, displacing 14 horses which were unable to even budge the immense load. The steel girder was shipped from Pittsburgh to this city over the Buffalo, Rochester & Pittsburgh Railroad for use in the construction of an addition to the McCurdy & Nowell store. It weighed 35 tons and was 60 ft. in length. The Rochester Carting Co. was assigned to convey the girder from the railroad yards to the store. With the aid of heavy jacks, twenty men and fourteen horses the girder was moved from the railroad car to two of the carting concern's big motor trucks. Planks were taken from a wagon which accompanied the moving force and laid on the bridge in front of the wheels. Horses were taken off the front of the trucks and hitched to the sides. Wheels were blocked to prevent their backing up under the terrific strain. The fourteen horses became unsteady and there was danger of the truck wheels leaving planks and breaking through the bridge. It was the failure of the horses successfully even to budge the wheels of the trucks that prompted the workmen to unhitch the fourteen horses to give the third motor truck a chance to show its pulling power. The motor of the truck was thrown into action and the great tow rope stretched itself and quivered under the strain. The wheels of the big truck began to turn and the great load advanced on the planking. As fast as the carrying trucks were dragged onto one set of planks, those behind were carried forward and laid straight and the motor truck moved forward. Big plates of sheet iron were laid where the planks joined, but they curled up under the pressure of the wheels. The work was a great success.



Electric Trucks in the Service of the Senter Pie Co. and the Macklem Baking Co., respectively, of Denver. The Electric is, in the Opinion of the Owners, Eminently Suited for Such Work

Facts and Figures Regarding Electrics

The Condition of the Electric Vehicle Business Between August 15th and September 15th—Users of Electric Fleets in the City of New York—Reports from Leading Makers

A Fleet of Eighteen Lansden Electrics in the Service of R. H. Macy & Co., New York City

Large Fleet of Waverley Electrics Now Being Used in the Service of the Fleischmann Yeast Co.

THE electric vehicle business during the period between August 15 and September 15 appears to have been favorable in every way to the manufacturer. Although the summer has hardly been hot enough to have much influence over the sales of electric vehicles, nevertheless the makers have experienced a general increase of orders from every line of business. One of the great features of the season has been the large number of new businesses that have made an initial purchase of motor trucks. In practically every business the present condition is that whenever delivery systems need modification in any way or whenever the exigencies of the business demand a greater number of delivery vehicles the point whether a big and definite change should be made of horse-drawn vehicles to electric vehicles comes up. The electric vehicle is being principally used in city delivery retail work. The appearance of the electric vehicle is largely in its favor for such work. In addition the electric is found valuable for night municipal work owing to the silence of its movements. In all cities possessing good pavements extending far into outlying suburbs there is a large field for the light electric vehicle.

Sales Made by the General Vehicle Co.

Some of the most important sales made by the General Vehicle Co., Long Island City, N. Y., during the period between August 15 and September 15 were an initial order placed by the Consolidated Gas Co., New York City, for five 2,000-pound wagons and three 750-pound wagons, a repeat order from the New York & Queens Electric Light & Power Co., Long Island City, for two 750-pound wagons, one 1,000-pound wagon, three 2,000-lb. wagons and three 2-ton trucks. Total sales made during this period represented repeat orders to the extent of 64.1 per cent. The 2,000 pound wagon has been most in demand.

The Anderson Electric Car Co. had no sales of any large fleets from August 15 to the present time, though business was very much increased over the month previous. No extreme loss has been experienced, due to the heat, as far as horseflesh is concerned, as little excessive heat has been experienced in this community. Thirty-three and one-third per cent. of the cars sold during the period mentioned were repeat orders. One thousand-pound and 2-ton capacity vehicles have been the most called for.

The Couple-Gear Freight Wheel Co.'s sales during the period of August 15 to September 15 have been fully 100 per cent. greater than in the like period during 1911. They do not consider that the hot weather has had any particular bearing on the orders received by them. It is true that the hot weather has its effect and results are being felt all the time, but in the case of orders received by the company during the period mentioned the hot weather had had its effect a long time ago as the orders were nearly all repeaters and came from people who decided 1 or 2 years ago to use the motor truck just as fast as they could arrange their business to take it on and could find the truck that would meet their requirements. Ninety per cent. of the orders received during the period mentioned were repeat orders and covered the 3½, 5 and 10-ton capacity sizes of commercial vehicles.

The use of large fleets of electrics is growing in big cities. Take New York, for example:

Concerns in New York City operating fleets of ten or more trucks made by the General Vehicle Co. are as follows:

Name	Business	No. of G. V. Electrics
Adams Express Co.	Express	129
Jacob Ruppert	Brewers	83
American Express Co.	Express	67
Peter Doelger Bwg. Co.	Brewers	54
George Ehret	Brewers	33
Fred'k Loeser Co.	Department Store	33
Motor Delivery Co.	Delivery Contractors	28
United Dressed Beef Co.	Packers	25
United Elec. Lt. & Pr. Co.	Central Station	24
New York Edison Co.	Central Station	23
Tiffany & Co.	Jewelers	21
Central Bwg. Co.	Brewers	17
Delaware, Lack. & West. R. R. Co.	Railroad	17
Greenhut-Siegel Cooper Co.	Dry Goods	17
H. B. Claflin Co.	Dry Goods	15
R. H. Macy & Co.	Dry Goods	15
V. Loewer's Gambrinus Brewing Co.	Brewers	14
Arnold Constable Co.	Department Store	14
Beadleston & Woerz	Brewers	14
Sulzberger & Sons	Packers	14
N. Y. & Queens Elec. Lt. & Pr. Co.	Central Station	12
N. Y. Butcher's Dressed Meat Co.	Packers	10

Including the above list there are in New York City distributed among various customers in different lines of business G. V. electric trucks in fleets of one to nine to the extent of 1,094.

Illustrated on page 68 are a group of twenty of the Abraham & Straus wagons and on the opposite page a group of fifteen of the Macy wagons, sold to these two companies by the Lansden Company.

The following is a list of some owners of Lansden electric fleets in New York City:

Abraham & Straus, Brooklyn	20
R. H. Macy & Co.	18
Gimbel Bros.	12
Jas. A. Hearn & Son	28
Adams Express	162
Steinway Piano Co.	4
Aiken Son & Co.	8
A. A. Vantine Co.	8
Bellevue Hospital	4
August Luchow	2
Geo. Ehret	10
Metropolitan Opera Co.	1
New York Public Library	1

The Baker Vehicle Company has sold fleets of trucks to the New York Edison Co., the American Express Co., the Westcott Express Co., the Consolidated Gas Co., the Geo. S. Strohmer Co., Brooklyn, and the Borden Condensed Milk Co.

James A. Hearn & Son owns a fleet of fifteen Anderson electrics and a fleet of twenty-nine Lansden electrics. The 14th Street Store owns fifteen Anderson electrics.

The Lansden Co. recently sold to the Adams Express Co. a fleet of fifty, and that company has now 162 trucks manufactured by the Lansden Co. in their possession.

The American Express Co. has in service the following electrically driven equipment: two 1-ton vehicles, eighty-three 2-ton vehicles, and five 3½-ton vehicles. The majority of this equipment is used to replace horse-drawn vehicles. The 3½-ton electrics are used in scheduled transfer service for short distances; this service has heretofore been performed by gasoline cars.

Electrics in Service of R. H. Macy & Co.

R. H. Macy & Co. have in commission at the present time the following: eighteen 2,000-lb. Lansden electrics, fourteen 2,000-lb. General Vehicle electrics, one 2,000-lb. Columbia electric used as an emergency repair car, another 2,000-lb. Columbia electric and one 4,000-lb. General Vehicle electric, the latter two being used on the Straus Pasteurized milk delivery. In addition, the company operates eight gasoline vehicles. We illustrate on the opposite page a fleet of Macy 2,000-lb. electrics.

The Waverley Co. has had a great many orders from express companies, department stores, grocers, brewers, electric lighting companies, etc. The largest single installation in New York City is that for the Fleischmann Yeast Co. This fleet is depicted in the illustration at the head of this article.

The H. C. & A. I. Pierce Contracting Co. has about thirty-five Studebaker electric commercial vehicles in service and a great proportion of these have been in service since August, 1909.

Gimbel Bros. have seventy-seven Studebakers, consisting of thirty-five model 25, 1,000-lb. capacity, twenty-seven model 26, 2,000-lb. capacity; six model 27, 3,000-lb. capacity, and six model 23, 7,000-lb. capacity. The majority of these cars have been in commission since September, 1910, and there was a new order for eleven additional cars which were delivered in November, 1911.

The Geo. Ehret Brewing Co. have fourteen Studebaker trucks, model 24, 5-ton capacity. Six of these were delivered about September, 1911, and eight were delivered last May and June.

The Motor Truck Leads to Greater Business

From these various figures with regard to big fleets operating in New York City it is easy to deduce one or two big facts. The most important of these is that once a fleet of electric trucks is installed in a big city by a progressive company there will undoubtedly be an extension of that fleet. From this it is evident that the trucks have extended business. It is a sure fact that originally when the first fleet was purchased the number at that time in hand was considered enough to cope with the requirements of customers. Customers do not become more stringent in their requests, nor more critical of deliveries. No; but business grows—the motor truck begets business.

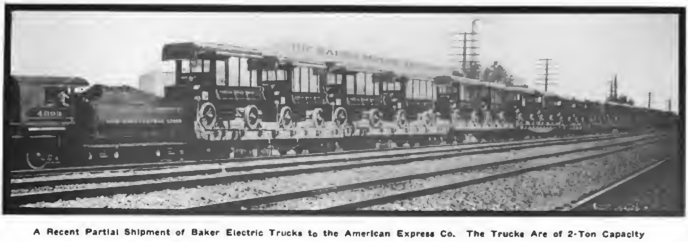
For a city of good streets, the electric vehicle is generally considered to be the best kind of delivery wagon for retail town delivery. The gasoline vehicle is the machine for long-distance and out-of-town work.

Some of the most important sales made from August 15 to September 15 by the Lansden Co., Newark, N. J., are as follows:

Adams Express Co.	9	1½	ton chassis.
Steinway & Sons	1	2	ton truck
Berkowitz Bros.	1	2	ton truck.
Jas. A. Hearn & Son	15	2000	lb. wagons.
Adolph Gobel	1	2	ton truck.
Borough of Richmond	1	3½	ton truck.
United States Express	3	1½	ton truck.
Adams Express	1	2	ton truck.
Bay State Paper Co.	1	1	ton truck.
Celluloid Co.	1	1	ton truck.
Spencer Wire Co.	1	2	ton truck.
Burns Bros.	1	3½	ton coal truck.
	1	5	ton coal truck.
Miami Power Co.	1	1	ton truck.
Bellevue Hospital	2		ambulances.
Eugene E. Nice	1	2	ton truck.
Batcheller & Co.	1	1	ton truck.
Consolidated Gas Co.	1	1	ton truck.
New York Health	1		ambulance.
New York Charity Orgn.	1	3½	ton truck.

About 25 per cent. of these sales are repeat orders.

If there has been any particular demand of one capacity truck over another the company believes that the 1½ and 2-ton trucks have predominated.



A Recent Partial Shipment of Baker Electric Trucks to the American Express Co. The Trucks Are of 2-Ton Capacity

The Fire Chiefs' Convention at Denver

The Meeting of the Fire Chiefs Occasions the Discussion of Several Pertinent Points With Regard to the Motorization of Fire Departments and the Comparative Value of Horse and Motor Fire Apparatus

FIVE out of the eleven papers read at the convention dealt with the subject of motor fire apparatus, and it is the universal opinion of chiefs in all parts of the country that motor fire apparatus is superior to horse apparatus in the matters of speed, cost of maintenance and operation, dependability and general reliability.

A CANVASS of the 550 chiefs at the convention showed that practically every town over 10,000 in population has one or more pieces of motor fire apparatus. A point raised at the meeting by the reading of a paper was the question whether the motor pumping engine is superior to the steam pumping engine.

MOTOR-DRIVEN fire fighting equipment was the almost universal topic of the discussion among the fire chiefs who met recently in Denver at the fortieth annual convention of the International Association of Fire Engineers. The main points of interest to chiefs of fire departments who intend to adopt motor fire apparatus in lieu of horse-drawn apparatus in the discussions at the Fire Chiefs' Convention are the following: 1. The superior efficiency of such apparatus with regard to speed. 2. The lowering of annual cost of maintenance and operation of motor fire apparatus as compared with that of horse-drawn apparatus. 3. The great dependability and reliability of motor apparatus. 4. The value of the motor pumping engine as compared with the steam pumping engine.

Of the eleven papers read and discussed at the meetings of the association, five of them dealt with motor-driven equipment, and none were more thoroughly discussed or listened to with greater attention than those on the subject of motors in the fire department service.

A canvas of the 550 fire chiefs gathered at Denver showed that practically every municipality of 10,000 inhabitants and over had one or more pieces of motor-driven equipment, and in some town, notably Savannah, Ga., horses had become an unknown factor in the fire department. Very few cities are there in which the chief's wagon is not a motor car, and usually the complete motorization of the department is only a matter of time after the advantages of motors over horses are demonstrated by the chief's own vehicle.

Speed Twice As Great With Motor

This fact may be taken as generally true, that wherever the horse has been replaced by the motor in fire department service the length of time to reach the fire from the station under average conditions is just about one-half of the time required for a similar piece of apparatus drawn by horses. That this means a very great deal to a fire department at the early stages of a fire when seconds mean thousands of dollars or perhaps even human lives, needs no dilation here. In the case of very long runs, the motors show the most superiority, for they can maintain any speed for the entire distance, whereas the horse driver must regulate his speed according to the distance. All in all, the advantage of the motor in the point of speed increases proportionately to the distance covered.

Very forcibly was this phase of the question presented to the chiefs at Denver on the evening of September 18 when an illuminated fire run was made. It included the major portion of the motor-driven equipment on display at the auditorium, as well as most of the horse and motor-driven equipment of the city of Denver. The run was less than 1 mile in length and the motorized equipment sped down the course with an ease that contrasted greatly with the efforts of the straining horses. At the finish the motors seemed and were capable of going indefinitely farther at the same rate.

Under average conditions of load, distance, streets and traffic, horse-drawn equipment can make from 10 to 15 miles per hour, while the motor-driven equipment under corresponding conditions can average between 20 and 30 miles per hour.

The Motor Is By Far Cheaper to Maintain

Fire department heads when questioned on the subject of cost used almost identically the same words in nearly every instance: "There is no comparison." All agreed that the motor was by far the cheaper to maintain. When pressed for relative costs their figures varied greatly, but in nearly every case the divergence was found to be due to one or both of two factors: Differences in local conditions, such as the cost of feed or quality of the streets; or to the length of time the motors upon which the figures were based had been in service. For instance, in the east, where feed for horses is comparatively high, and the streets are better, the difference in cost of maintenance is greater than it is in the western states, where feed is cheaper. Figures for the cost of keeping a horse vary between $15 and $25 per month. Chief Kenlon of New York finds that the average cost to keep one horse 1 month in the fire department service of that city is approximately $20 per month. In this statement Chief Bowker of Passaic, N. J., coincides, as do most of the others. Chief Kennedy of Billings, Mont., finds that each horse costs him $17 per month; Chief Post of Shelby, O., puts the figure at $19. San Francisco, St. Louis, Chicago, Los Angeles, Cleveland, Cincinnati, Boston, Savannah, New Orleans, Montreal—in fact all of the larger cities—expend very close to $20 a month for each of their horses, so this figure can be taken as a good average.

Cost of Maintenance Varies Greatly

Cost of maintenance of motor apparatus shows wide variation. A chemical and hose combination costs the city of Shelby, O., $2.60 per month for maintenance, including repairs, gasoline, oil, etc. The motor displaces two horses at $19 per month each or a total of $38 for the two. This represents a saving of $35.40 to the city per month, or over 90 per cent. T. F. Kennedy, chief of Billings, Mont., fire department, finds that triple combination displacing three horses costs $10 per month. The horses cost $17 each or $51 total per month, a saving through the motor of $41 or better than 80 per cent.

If we consider the cost of up-keep of motorized versus horse companies instead of the individual pieces we find an interesting comparison. Norfolk, Va., has both motor and horse companies. The comparison of the up-keep of one of each class of company, according to R. T. McLaughlan, chief of the Norfolk department, showed $42 up-keep of the motor company for a period of 2½ months and for the horse company for the same 2½ months the cost was $196, or nearly five times as much. The motor company in this case consisted of one motor pump and one combination hose and chemical wagon. The equipment of the horse company consisted of a four-horse steam pump and one two-horse combination. In none of the instances referred to has the saving in wages of the men been considered.

Savannah, Ga., a city of about 100,000 population, has effected a saving of $2,225.78 in 5 months by the use of its motor-driven equipment, according to Chief Ballantyne. This city is completely motorized. It has fourteen pieces, including two chief's cars. The pumps are all gasoline except three, which are motorized steamers and are held as reserves.

Very naturally one of the first developments in the way of the motorization of fire departments was the actual substitution of a gasoline tractor instead of the horses, hitching the tractor to the same machine as the horses had formerly pulled. This method of motorization has been very successful, particularly with such heavy pieces as steam pumps, aerial ladders and water towers. New York is perhaps the leader in this method of motorizing, although some other towns are employing it. Passaic, N. J., is one of these and the chief of its fire department, R. H. Bawker, is authority for the statement that the cost of hauling the apparatus so equipped was one-tenth of the cost of hauling the same apparatus with horses. During the year ending May 30, 1912, the two tractors averaged a total and inclusive cost of $8.85 per month against the cost of $190.10 per month for horses on the same apparatus.

New York in Favor of Tractor-Pulled Steamer

New York leans to the use of the tractor-pulled steamer rather than to the true motor pump. Chief Kenlon's figures as to the economy of tractors in New York brought out a more comprehensive method of comparing the economy of the animal and mechanical propulsion. Kenlon believes that to arrive at the true basis, interest on the investment, depreciation, etc., should be considered along with the other costs. He assumes the life of a tractor in his department to be 12 years and the life of a horse to be 7 years. The interest at 4 per cent. on an investment of $4,000 for a tractor is $160 and the depreciation in value amounts to $333. Similarly, the interest on the three horses at $350 each displaced by the tractor is $36.75, and their depreciation $150.

Of even more importance than economy is the question of reliability. Can motor apparatus be depended upon to be on the job when needed? The opinion seems to be very general among fire engineers that it can. So far as the tractors are concerned, there seems to be no doubt. Chief Kenlon states that during the 6 months ending August 19 a motor-drawn steam fire engine has answered upward of 500 calls, and in no case has it failed to reach the fire, in most cases in better time than the horses. On the strength of this performance the city of New York has just let the contract for twenty-eight tractors. Sixty-one new companies are being organized fully motorized. Instead of stables the stations are garages.

In the winter season when snow and ice cover the streets it does not interfere to any great extent with the operation of the tractors. In one instance, Chief Bawker states, it snowed continuously for 24 hours when an alarm was turned in from the hill section of the city. A speed of 15 miles an hour was made through streets unbroken by traffic. The best horses could have done under similar circumstances would have been 5 miles per hour.

According to Geo. C. Hale, fire and water commissioner of Kansas City, Mo., a motor-driven three-way combination got to a fire and handled it through 26 inches of snow when all the horse-drawn equipment became irretrievably stuck. With chains on all four wheels and the load helping to give traction, these motor-driven pieces can go through storms that horses cannot face.

The Question of the Pumping Engine

There is not the unanimity of opinion in regard to the availability of the gasoline motor as a pumping engine that there is as to its advantages as a propelling unit. Motor pumps as distinguished from steamers have not yet entirely proved their reliability to the complete satisfaction of many fire engineers, who hold that though the gasoline engine is the best method of getting the pump to the fire, the steamer is the better for doing the pumping. One of the reasons advanced by the adherents of the steamer as a pump in conjunction with the motor as the propeller, is that it is asking too much of the gasoline engine in its present state of imperfection to expect entire reliability for hours of steady work at top load after it has been pushed to get the pump there in the shortest possible time. Adherents of the motor pump say that if the motor is looked after and operated by a competent man, and by that man alone, there need be no fear of premature exhaustion of the motor from overwork. In support of this contention, Chief Magee, of Dallas, Tex., who allows but one man to look after his motor pump and permits no one else to lift the hood, mentions one long stretch of work which proved the reliability of the motor pump to his satisfaction. After getting the pump to the fire in record time the motor pumped water for three lines of hose for 17½ hours and for one line of hose for three hours longer. The operators of the Dallas motor pumps number three to each pump and work on three shifts. One of these is called the chief engineer and gets $10 more per month than do the other two drivers. He has complete charge of the motor and no one else is permitted to raise the hood.

The man must know his motor. As Chief Ballantyne puts it "You can't put a figurehead up on the driver's seat and expect reliability." Motors are not foolproof yet. The man must recognize knocks and not try to adjust the carbureter when the motor grunts from the cold water running through its jackets. Ballantyne tells of a fire in the cotton storehouses along Savannah's waterfront. It was necessary to put seven motor pumps in hubdeep on newmade ground where horses could never go. With these he pumped twenty-one streams for 8¼ hours and three for 13 hours without the least sign of trouble. Each of the seven pumps ran at top speed continuously.

The question of the reliability and efficiency of the motor-pumping engine is dealt with fully in the paper read before the convention by Geo. W. Booth, and reproduced on the next page.

New Fire Apparatus in Philadelphia

DELIVERY of a new high-pressure chemical wagon to the bureau of fire, Philadelphia, was made recently, the wagon successfully passing all tests. The truck is equipped with all necessary paraphernalia, including 1500 feet of 3½-inch hose, 300 feet of 1-inch 4-ply hose, 60-gallon chemical tank, axes, etc., and is capable of developing a speed of 30 miles an hour. It will be assigned to the mill district, where the question of speed is paramount.

Are Motor Pumping Engines Efficient?

Some Valuable Facts and Figures with Regard to This Question Given in Paper Read by Geo. W. Booth at the Fire Convention at Denver

THE term "efficiency," as used by George W. Booth, chief engineer, Committee of Fire Prevention, National Board of Fire Underwriters, in his paper read before the International Association of Fire Engineers, is to be considered as meaning the power to accomplish the desired work; that is, of pumping, at a fair working pressure, the amount of water corresponding to the rating of the machine, and somewhat lesser quantities at higher pressures, corresponding to conditions under which it may be called upon to operate in actual fire practice.

The tests given in the table on the next page, and on which the deductions in this paper are based, were made by various engineers of the National Board. The conclusions were mostly arrived at after discussion among the engineers, and are to be considered as personal with them and not as the official opinions of the National Board of Fire Underwriters.

For purposes of comparison between the performances of the automobile engines tested and of the steam fire engines, there may be noted the following results of tests of three new second size steam engines tested in Chicago in April, 1912; the results are probably fairly representative of what may be expected of this size steam engine. Capacity tests, continued for an hour, showed an average discharge for the three engines of 725 gallons per minute at a net pressure of 157 pounds; high pressure tests, also continued for an hour, showed an average discharge of 409 gallons per minute at a net pressure of 275 pounds. The net horsepower developed at the pump during these various tests ranged from 61 to 72 and averaged 66½.

Either a Reciprocating or Rotary Pump Is Satisfactory

With regard to the type of pump the attitude of the engineers of the National Board is that either a reciprocating or a rotary pump is satisfactory for fire engine duty, providing the pump is designed to overcome certain defects which have been evident in the past, and has proved itself able to do so in service; these defects include lack of efficiency, a tendency to wear and develop high slip which is not easily corrected, and an undesirable amount of vibration in the apparatus.

In order that a fair comparison may be made between the performances of various makes of apparatus, it is necessary to establish a standard for both discharge and pressure, since both these factors enter into a determination of efficiency. The standard noted in this connection two years ago has been adhered to, and is as follows: "That the engine and pump shall be able to deliver the rated capacity of the pump at 120 pounds net pressure, and at least 50 per cent. of its rated capacity at 200 pounds net pressure."

The net pressure is the difference between the readings of the discharge and suction gages when working at a hydrant, and the sum of these readings when working at draft and the suction gage indicates a vacuum.

The automobile fire engine is in many ways a more complicated piece of machinery than the steam fire engine, and because of this and the inability to get highly trained men to care for and operate them, their efficiency is liable to fall off considerably in actual service. As a consequence, a certain amount of excess capacity is required, both in the pump and in the engine, to offset this liability and provide sufficient power under all conditions. In regard to the pump, for all except village service, two good fire streams should be available under ordinary working conditions, which, with the modern use of hose with smooth lining and of nozzles of good size and discharging capacity, means an actual delivery of 500 to 600 gallons. With all pumping apparatus, the slip may be expected to increase with use and other conditions will tend to reduce the capacity of the pump, so that a capacity of 700 gallons is not too much for most cases, and for metropolitan service even larger capacity may be desirable. City service, at serious fires when the maximum engine capacity is needed, will most often call for such lengths of hose lines and sizes of nozzles as to require an engine pressure of 120 to 150 pounds, with pressures up to about 200 pounds for fires in high buildings or for suburban service. These figures have therefore been adopted as approximate standards for testing purposes.

Machines Should Be Provided with High-Powered Motors

As applying to the power of the engine, the tests indicate that under certain conditions likely to occur in practice only 50 to 60 per cent. of the horsepower developed by the engine appears as useful power developed by the pump, as measured by the water discharged and the pressure registered. It is the opinion of all the engineers who have observed tests of automobile pumping engines, that these machines should be provided with high-powered motors, so that it will not be necessary to run them, when the pumps are delivering their maximum capacity, at a speed greater than is safe and reasonable for the long continued service which they may often be called upon to perform. It is believed that a reasonable and reliable speed will be not much in excess of 1,000 feet per minute piston travel, as assumed in the A.L.A.M. rule. Interruptions and breakdowns during tests were most often due to running the motor at high speed.

There is a growing tendency among manufacturers of motor-driven fire apparatus toward high-powered motors, since they decrease the liability of heating or other engine troubles and of vibration and consequent loosening or breaking of small parts.

Comparison Between Motor and Horse Apparatus

In a broad consideration of the relative values of self-propelled and horse-drawn fire apparatus, there must, of course, enter the question of the advantage to be gained by quickness of response, but this question has not here been considered; if then only the ability to pump water is borne in mind there appears to be no reason why the motor-pumping engine should not be placed in comparison with the machine it is displacing, the steam fire engine. In making such a comparison there is one feature on which there is not yet sufficient data to base a definite conclusion, namely, the ability to operate efficiently and without serious interruption at fires extending over long periods, and especially under adverse conditions of weather. It is not intended to argue that motor-driven pumping engines may not have this ability, but simply that they have not proved it, as have steam fire engines; it is believed that they will be developed to possess this ability, if they do not possess it already, and observations and reports by the members of this association will be the best means of deciding the question.

Another question, which can in many cases be answered with certainty only after apparatus has been in service for sometime, is the effect of depreciation with age and use, as indicated by ability to withstand long and severe service without injury or breakdown of any of its parts. In designing any new type of apparatus it is, of course, to be expected that there will be certain features susceptible to improvement; some of these faulty features have already been discovered and corrected and the desire and intention of the manufacturers to perfect their product is encouraging.

Mr. Booth goes on to say that improvements in design will undoubtedly result in a simplification of the machine, and a general reduction of the number of parts and in some cases of the weight of the apparatus. Automobile fire apparatus does not receive as constant service as commercial apparatus, but its use is generally more severe; considering everything, there is no reason why it cannot be constructed to have a life almost as great as the steam fire engine, and to maintain an equal efficiency. To obtain these desirable results, proper design and construction are essential; following these, the point which requires perhaps the strongest emphasis is the necessity for skilled attention and proper and intelligent care of automobile apparatus, especially pumping engines; the necessity for attention can be determined in many cases only by tests which will duplicate conditions obtaining at a hard fire, and these tests should be made systematically and at least once a year

Results of Tests of Motor Pumping Engines

Make of Apparatus	City (Operated by)	Weight, Without Men or Hose, Pounds	Date When		Engine Cylinders		Horsepower, A. L. A. M.	Ratio Engine Speed to Pump Speed	Type of Pump	Specified Discharge in Gallons	Tested at	Gallons per Minute Discharged	Pressure at Pump, Pounds		Duration of Test, Minutes	Horsepower Developed at Pump	Per Cent. of Engine Horsepower by A. L. A. M. Rule	Remarks
			Put in Service	Tested	Number	Size							Observed	Net				
American La France	Stamford, Conn.	7,300	Dec. 1911	June, 1912	6	5½"x6"	72.6	1.6 1	Rot'y.	700	Draft.	663	101	111	31	42.9	59	Eng., about 1,400 rev. Proper rating is about 600 gallons.
(Combination pumping engine and hose wagon)	(Regular Engineer)											413	204	211	6	50.8	70	
	Englewood, N. J	6,800	Oct. 1911..	Oct. 1911 .	4	5½"x6"	48.4		Rot'y.	500	Draft.	450	100	105	10	27.6	57	
	(Delivering Engineer)											301	159	164	2	28.8	60	Max pressure which could be obtained
	(Reg Eng)			July, 1912							Draft..	428	109	113	60	28.2	59	
												261	165	169	3	25.8	53	Automatic relief valve prevented higher pressure
	At Factory	7,300		Aug. 1912	6	5½"x6"	72.6		Rot'y	700	Draft..	324	252	256	3	47.4	65	
												463	205	209	3	56.5	78	
												529	160	164	3	50.6	70	
												597	125	129	3	44.9	62	
												672	45	49	3	19.2	26	
Waterous. (Pumping engine)	New York	13,000	Sept. 1911	Sept. 1911	6	7¼"x8"	126.0	2 1	Recip.	700	Draft..	744	120	128	20	55.6	44	Engine not run to max. cap.
	(Del Eng)											558	198	206	20	64.5	51	
												681	160	168	20	66.8	53	
	Bridgeport, Conn (Del Eng)	13,000	June, 1912	June, 1912.	6	7¼"x8"	126.0	2·1	Recip.	700		729	127	132	60	56.1	44	Eng., 625 rev.
												574	196	201	5	67.3	53	Eng., 470 rev.
												654	144	150	5	57.2	45	Eng., 540 rev.
												871	133	139	2	70.6	56	Short test to show extreme cap.; engine, about 800 rev.
Robinson.. (Combination pumping engine and hose wagon)	Evanston, Ill.	10,000	Oct. 1911	Oct 1911	6	6¼"x6¾"	94.0	3 1	Recip	750	Hyd't	779	130	130.5	60	59.3	63	Eng., 900 rev.
	(Del Eng)											494	200	177	5	51.0	54	Eng., 570 rev.
	(Reg Eng)											441	224	194	5	50.0	53	Eng., 510 rev.
				June, 1912							Hyd't	787	153	145	60	66.5	71	Eng., 900 rev.
												1,022	118	114	5	68.0	73	Eng., 1,180 rev Short test to show extreme capacity
	Wilmington, Del (Del.Eng.)	10,000	May, 1911.	May, 1911	6	5½"x6½"	72.6	3 1	Recip.	700	Draft	662	103	105	30	40.5	56	Eng., 810 rev.
												303	191	192	15	34.0	47	
Knox (Combination pumping engine and hose wagon)	At Factory	12,000		Apr 1911	6	5½"x6"	72.6	4 7 1	Recip.	700	Draft	690	123	128	30	51.4	71	Eng., 1,430 rev.
								6 5 1				416	212	217	10	52.6	72	Eng., 1,260 rev.
	At New York	14,000		Mch. 1912	6	6½"x7½"	101.0		Recip	700	Draft	784	125	131	187	60.0	59	
												463	210	215	60	58.2	58	
Webb (Combination pumping engine and hose wagon)	Passaic, N. J	5,700	Nov 1910.	Nov. 1910.	4	5½"x5½"	48.4	.	Rot'y.	600	Draft.	525	91	93	5	28.4	59	
	(Del Eng)											218	155	157	9	20.0	41	
	(Reg Eng)		Nov 1910	Aug 1912							Draft	400	86	91	60	21.2	44	
												184	123	128	7	13.7	28	
	Westfield, N. J (Del Eng)	6,500	Dec. 1911	Dec 1911	6	5½"x5½"	72.6		Rot'y	650	Draft.	630	115	118	15	43.4	60	
												392	148	150	.	34.3	47	Max pressure obtainable
Nott. (Combination pumping engine and hose wagon)	Cleveland, O	10,500	Aug 1912	Aug. 1912.	4	5¾"x8"	52.8	4.3	Rot'y	500	Draft.	543	126	130	25	41.3	78	Eng., 850 rev. Two pumps, either or both of which may be used
	(Del.Eng.)											269	267	270	15	42.4	80	Eng., 776 rev.
Ahrens-Fox. .. (Combination pumping engine and hose wagon)	At Factory	12,500		Aug 1912.	6	5½"x6½"	72.6	3.110 1	Recip.	700	Draft..	759	120	122	11	54.0	74	Eng., 1,130 rev.
								4.387 1	6½x4			418	204	206	30	50.0	69	Eng., 850 rev.

Brewery Deliveries

Eleven Trucks of Four Makes in Use by the Feigenspan Brewery Bring 40 per cent of New Business

4,400 cases delivered daily. Greatest requirement of any delivery service—reliability—is found with motor trucks. An elaborate garage to house same has recently been completed, including machinery equipment, etc.

ANYBODY who has ever sat on the south side of a railroad train traveling by night eastward toward New York or westward away from the Metropolis must have observed on the eastern edge of the city of Newark a brilliant electric sign, apparently suspended in midair, bearing the brief legend, "P. O. N." In its shadow is a new garage, thoroughly up to date in every respect, which houses during leisure hours 17 automobiles, and whose sole business on earth at present is the distribution of liquid refreshment over a large and thirsty territory and the collection of payment therefor.

It might be well to explain the mystery of that sign, which thousands and thousands of people have seen from the mesh of railroad lines that crosses the "skeeter-infested" meadows of New Jersey. "P. O. N." means "Pride of Newark," the bottled and barrelled product of the brewery of Christian Feigenspan, a corporation. It is a corporation which has made an exhaustive study of the motor truck, and, having tested its utility in a large and, perhaps, unusually expensive way, has found it good clean through to bed rock. The proof of the finding will be realized from the fact that the garage which houses the brewery motor equipment was constructed as the first of three units to accommodate 25 mammoth auto trucks. It is expected that the second of the units will be started in a very short time.

Big Extension of Business Follows Motor Installation

There are 11 trucks at present in use by the brewery, 6 of the 17 autos being ordinary Hupmobiles, five of which are used by the collectors of the concern. The sixth is a service car. This title is, however, merely nominal, for the service car seldom services. It spends most of its time slumbering away in a corner of the garage.

Four different makes are represented by the 11 trucks, which range in capacity from 3 tons to 7 tons. The aggregate tonnage is 62. There are two 7-ton Hewitts, four of the 6-ton Knox manufacture, three 6-ton Rapids, one 3-ton Knox and a 3-ton Alco. As an idea of what they have accomplished for the brewery, it is stated that 40 per cent. of the business they handle is new business secured directly through their use. This can probably be reduced to a more specific statement by the employment of a few figures.

The average load of a 6-ton truck is 200 cases or 60 half barrels. Sixty-two tons distributed among eleven trucks is almost a 6-ton load to each. The trucks make two trips daily. Therefore they deliver an aggregate of about 4,400 cases, or 1,320 half barrels daily. And 40 per cent of this total has gone to the Feigenspan corporation because of its automobiles!

The first trucks the brewery bought were the Rapids. They began their service New Year's Day, 1910. Then came in the order named the Hewitts, two Knoxes, the Alco and two more Knox trucks. Long hauls are the rule, the average trip being from 40 to 45 miles a day. Sometimes a run is as much as 80 miles—in the two trips. The machines are used exclusively in suburban delivery.

Newark is a city of many breweries and, because of keen competition, the Feigenspan people are reluctant to go into details of expense in delivery and upkeep. It is asserted, however, that the cost is high—very high. Facts that are responsible for this will appear later. Despite the circumstances of expenditure it is declared that the credit side of the ledger shows a larger balance than would be possible with delivery by horse.

"The extended field of usefulness of the auto truck is one of the strongest arguments in its favor," says J. L. Black, who has charge of the Feigenspan motor equipment. "We have been able to get business that we could not get before and we are able to do the work for less than we could have it done with hired teams."

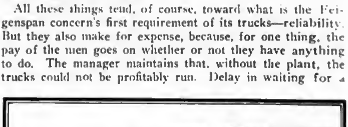
In regard to the why and wherefore of the high expense which the brewery confronts, there is a number of factors that make for it. The rules of the labor union add no inconsiderable item to the total. They require, for instance, two men on each truck, when one might do the work. The peculiar nature of brewery deliveries is still another item. It increases expense because it consumes valuable time. The coal man, the wholesale grocer, the dry goods merchant delivers his burden and hastens onward. The brewery truck not only delivers a load, but returns with one in the shape of empties which it must take on at each stop.

The Extensive Garage Equipment

But the main factor of expense in the Feigenspan case would seem to be the extensive garage equipment. Not one of the trucks has ever seen the inside of any repair shop save that of the garage, which is equipped to do almost anything that needs to be done, however serious. It comprises a force of six men, under the direction of Mr. Black, who has been identified with automobile affairs for 16 years.

The garage plant includes machinery modern in every respect. There is a power grinder, a drill press, a hack saw, lathe and a full set of portable electric tools. A milling machine is soon to be installed. So far the plant has chiefly been used for strengthening parts it has been found necessary to strengthen to fit the special needs of brewery delivery. As some improvement of this sort suggests itself to Mr. Black, the truck is rolled into the shop and the work done without delay that might be incident if the machine were taken elsewhere. Further, Mr. Black, because he is always on the spot, is able to see that the necessity is met exactly as he wishes it to be met.

All these things tend, of course, toward what is the Feigenspan concern's first requirement of its trucks—reliability. But they also make for expense, because, for one thing, the pay of the men goes on whether or not they have anything to do. The manager maintains that, without the plant, the trucks could not be profitably run. Delay in waiting for a



Part of the Brewery Fleet of the Christian Feigenspan Corporation of Newark, New Jersey truck out of service means much, he points out, when the pay of the men attached to it must continue and customers cry stridently for their bottles and barrels and competitors strive strenuously to gobble up the business that temporarily has to be neglected.

The brewery breaks in its teamsters when operators are needed. It is contended that they are by far better than the ordinary driver, whose over-confidence, as an instance, is, it is asserted, apt to make him careless. Again, broken-in teamsters "cover" the load better and handle their deliveries with more skill.

The Feigenspan garage was completed during the last summer. It is 76.7 feet wide and has a depth of 115 feet, occupying the numbers from 266 to 270 Passaic avenue. The second and third units may be added by a simple process of construction, worked out by the architects, Hooper & Co., of Newark. The repair plant occupies a space in the front of the structure 74 feet by 39. The roof of the building is carried on a clear span, without any interior columns. The span supports steel trusses resting on wrought steel columns inclosed in the brick walls. Two immense fireproof doors shut off the repair plant from the remainder of the interior. There is a slight grade of the floor for drainage.

The lighting facilities are excellent, both windows and skylights being used. The building is 28 feet high, of practically fireproof construction throughout.

Insuring Delivery on Day of Order

"WE'LL deliver it to-day," is the slogan adopted by an enterprising Western merchant, who recently replaced his horses and wagons with KisselKar trucks. The slogan appears in his newspaper advertising, in the trolley cars, on his show windows, on his trucks; in fact, a complete advertising campaign is being carried on around the new and quicker delivery service.

This merchant declares that results from his enterprise in putting on motor wagons and advertising them has proved very profitable.

Formerly he was obliged to make a rule that no promise of delivery the same day should be made to customers making purchases in the afternoon. Many sales were actually lost because of this necessity. Now he can positively insure delivery before night of articles bought up to 4 o'clock and in some cases later.

He also considers that the appearance of enterprise and prosperity draws the crowds regardless of anything else.

A saving of $18 a day delivery expense is the claim of the Marshalltown, Ia., Bottling Works in discussing the replacement of three teams of horses with one KisselKar 2-ton truck. The truck had been carrying loads of 7,600 pounds, 1,600 pounds above rated capacity.

3-Ton G. M. C. Truck in the Service of H. J. Purse, Produce Distributor of Detroit, Mich.

Trucks for Produce

Distributor of Fruits and Vegetables in Detroit is Using Successfully a 3-ton G.M.C. Truck

THE truck is used for delivering to the markets and also for retail delivery, being in service each day for a period extending from 14 to 17 hours. Several carloads of fruits and produce are delivered before noon.

THAT the motor truck is coming into more and more general use every day is evidenced by the introduction of mechanical transportation into many lines of business that have heretofore held strictly to horse haulage. Although Detroit, Mich., is famous the country over as a city of automobiles, there are many lines of business that have been slow in adopting the motor truck. The latest field to be invaded in Detroit is the wholesale fruit and vegetable business and it is said that the work being done by the 3-ton G. M. C. truck illustrated has more than justified the change from horse-drawn methods.

H. J. Purse, car-lot distributor of fruits and vegetables, is the man responsible for starting something new in the wholesale produce trade in Detroit. At first Mr. Purse was somewhat skeptical as to the adaptability of a motor truck to his service, but now after giving the vehicle a thorough tryout, he is more than enthusiastic.

The truck leaves the garage every morning between 1 a. m. and 1:30 a. m. and delivers several carloads of fresh fruits and vegetables to the markets before 9 a. m. in the morning. During the remainder of the day the truck is used in retail service, making deliveries to groceries and markets all over the city. Each day the truck is in service from 14 to 17 hours.

When it is borne in mind that two double teams and three single rigs are required to do the same work that the motor truck is doing every day, there can be very little doubt as to the economic value of the motor truck in wholesale produce delivery. But it is not alone from the standpoint of cost that the motor truck makes a good showing—the ability to make speedy deliveries is also an advantage. Berries, peaches, apples, vegetables, etc., come to Detroit from the south and west in refrigerator cars and it is desirable to get the cars unloaded and deliveries made as fast as possible on account of the perishable nature of the goods.

The illustration shows the truck loaded with 75 barrels of potatoes, lettuce and garden truck, which were all delivered to one man in the Eastern market. The weight of the load was approximately 4½ tons.

Trucks to Transport in Sierra Nevada Mountains

TWENTY heavy duty "Durable Dayton" motor trucks have been purchased by the Utah Construction Co., of Salt Lake City. Sixteen of these are 5-ton models and the balance 3-ton. The total investment is $85,600. Immediate delivery of the entire fleet of trucks is specified in the order. These trucks will be put to work in the Sierra Nevada mountains on a specially built road. The first job for the trucks is to transport 30,000 tons of cement from a railroad terminal 30 miles up to the mountain where a big dam will be constructed. The trucks will run on schedule time on a road cut through the mountains by this construction company. All trucks will run 20 hours per day, a double shift of drivers having been employed. Each truck is equipped with electric lights, special dump bodies and long-stroke motors. The chassis is the regular standard model.

Wanted—Dealers!

An Advertising Campaign Carried Out by the Alco Company for Dealers to Handle Its Trucks

FOUR letters were sent successively to a list of prospective dealers. Seven months' correspondence resulted in an increase in selling agencies of 364 per cent.

AN advertising campaign by a motor truck company is entirely useless unless it is taken advantage of by the selling organization. Frequently concerns have launched nation-wide campaigns of advertising through the trade press, through the monthly magazines, through the big weeklies, and through the daily papers, but have failed to take advantage of such by a strengthening or reinvigorating campaign of concentration on the part of the selling force.

A good example of co-operation between the advertising department and the selling department was the Alco interests when last fall they made a special campaign for dealers, through the trade press.

The advertising campaign was opened the last week in November in 1911. It was a one-week campaign, consisting of 16-page advertisements. About 600 replies were received almost immediately from small and large towns throughout the country. In addition to publishing the advertisement in two weeklies (*Motor Age* and *Automobile*), reprints of the advertisement were made and sent to about 7,000 prospective dealers. This general campaign was immediately followed up by a series of 4 letters to each dealer. The first letter was sent the third week in November; the second letter a week later, and the remaining ones followed at one week intervals.

Analysis of Four Letters Sent to Dealers

The first letter treated on the responsibility of the Alco company financially and otherwise, dealing with the magnitude of its factory organization, its widespread financial backing, etc.

The second letter served as an analysis of the Alco line of trucks, showing its general suitability for varied fields of service.

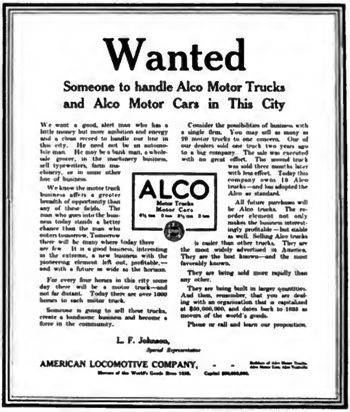
The third letter consisted of excerpts from testimonial letters; these testimonials being carefully selected so as to apply to nearby owners, making it certain that a dealer in Salt Lake City did not receive testimonial letters from owners in Jacksonville, Fla., or Bangor, Me.

The fourth letter outlined the policy of the company in its liberality to the dealer, by way of co-operation in inspection, service, and the dissemination of general information on trucks.

The general policy of the Alco company was first to establish the fact that it was possible for a pleasure car dealer to handle trucks in addition to his pleasure car line. A second argument was the possibility to handle Alco trucks in particular. The dealer was shown the possibility of business in the truck field from repeat orders. Examples were cited, one being a refining company which originally bought one truck and has since placed 17 repeat orders. Care was also taken to point out the enormous truck-buying possibilities of this country, an estimate being that there is a possible market for 400,000. (The ultimate market is probably 5 times this.) The company also analyzed how dealers might gauge the truck-buying ability of their own town or city by counting the number of horse vehicles passing any business corner, and dividing this by three, which will give the number of trucks it is possible to sell. The argument was also expounded demonstrating the all-year-round use of the truck.

The results of this series of letters was that 50 per cent. of the dealers written to wrote asking for additional information. Some of these dealers wanted the names of a dozen owners. Some wanted to know if it were possible to carry trucks on a 20 per cent. basis. Some, in fact many, wired for a dealers' proposition. Not a few came to the factory office to take up the dealers' proposition.

Correspondence as a result of this campaign continued vigorously for over seven months. About the middle of November seven specialty men from the factory were sent out to close the agencies with different dealers. Two of these seven had previously been good automobile men in the Alco employ, the others were men who understood salesmanship and the marketing of commodities. Three of these seven are still out. The territory has been worked in five major divisions, the South centering around Atlanta; Canada with headquarters in Montreal; the East centering in New York; the Middle West centering in Chicago, and the West centering in San Francisco. This force of seven men has been engaged entirely in the establishing of agencies. Each agent had to agree to take a demonstrating truck, and often the factory man lived some time with the new dealer, assisting him in securing a proper location for his salesroom, in educating local salesmen for him, in installing proper systems for keeping track of trucks sold, in installing methods of compiling suitable lists of prospective purchasers, and in doing the hundred and one other things that it is necessary for a dealer to know who enters the truck field for the first time.



Wanted

Someone to handle Alco Motor Trucks and Alco Motor Cars in This City

We want a good, alert man who has a little money but more ambition and energy and a clean record to handle our line in this city. He need not be an automobile man. He may be a bank man, a wholesale grocer, in the machinery business, sell typewriters, farm machinery, or in some other line of business.

We know the motor truck business offers a greater breadth of opportunity than any of these fields. The man who goes into the business today stands a better chance than the man who enters tomorrow. Tomorrow there will be many where today there are few. It is a good business, interesting in the extreme, a new business with the pioneering element left out, profitable,—and with a future as wide as the horizon.

For every four horses in this city some day there will be a motor truck—and not far distant. Today there are over 1000 horses to each motor truck.

Someone is going to sell these trucks, create a handsome business and become a force in the community.

Consider the possibilities of business with a single firm. You may sell as many as 20 motor trucks to one concern. One of our dealers sold one truck two years ago to a big company. The sale was executed with no great effort. The second truck was sold three months later with less effort. Today this company owns 18 Alco trucks—and has adopted the Alco as standard.

All future purchases will be Alco trucks. The re-order element not only makes the business interestingly profitable—but stable as well. Selling Alco trucks is easier than other trucks. They are the most widely advertised in America. They are the best known—and the most favorably known.

They are being sold more rapidly than any other.

They are being built in larger quantities. And then, remember, that you are dealing with an organization that is capitalized at $50,000,000, and dates back to 1835 as movers of the world's goods.

Phone or call and learn our proposition.

L. F. Johnson,
Special Representative

AMERICAN LOCOMOTIVE COMPANY, - -

The Full Page Advertisement Inserted in Trade Papers which Obtained Such Good Results for the Alco Co.

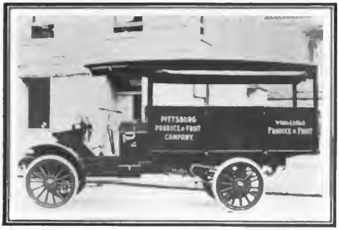
As a result of these efforts, including sales and advertising to secure more dealers, the Alco sales agencies have increased 364 per cent. in about a year's time. Since January 1 last, the agencies have increased over one year previous, 600 per cent. There are now only about fourteen cities in the United States in which agents are still required. In these cities, the company is advertising direct in the newspapers, the copy being similar to that reproduced here. This advertisement was tried in Minneapolis, a city which the company had been trying to get for the last seven years. The special representative on the ground stated that about 75 inquiries were received and that he had so much correspondence that he was not even able to acknowledge receipt of the numerous letters. At one time he had as many as five people standing in line to see him. The first inquiry came in before he had time to register at the hotel 9 o'clock Sunday morning, the first advertisement appearing in the Sunday morning issue of the Minneapolis *Tribune*. While it was impossible for him to interview all who wished to handle the Alco line in Minneapolis, he stated that he could have placed the agency with any of at least six that would have been satisfactory. He made no special effort to get the man who was already in the automobile business, as can be seen from the advertisement, and as a result inquiries were received from men in banks, typewriter salesmen, farm machinery salesmen and big men in the insurance companies, also a woman who had a little money and wished to stake her husband in business and so on.

While the greater part of the newer dealers are men who have already been in the automobile business, yet the Alco has a number of notable exceptions. They have, for instance, a man who had been in the contracting business, another in the machinery business, and so on.

Motor Truck Industry in Central Ohio

THE month was good from every standpoint for the motor truck industry in Columbus and in fact all parts of central Ohio. Dealers have been making a good number of sales and the records show that the month was far ahead of the corresponding period in 1911 as to the volume of business. The motor truck idea has now taken firm root in the Buckeye capital and as a result the dealers do not need to spend any great deal of their time in arguments of the relative value of a motor system with a horse system.

The only thing that the dealer is now called upon to demonstrate is the relative value of his truck over and compared with other trucks. The month has been a good one as to the larger trucks and now practically all of the wholesale groceries have changed from a horse-drawn system to motor trucks. Commission men have done the same thing and the contractors and material men are gradually adopting the motor truck. Lumbermen adopted them among the first. Other branches of business which have taken up the motor delivery are retail establishments in dry goods, clothing; bakeries and candy manufacturers.



Adams Truck with Special Sliding Panel Body for Pittsburg Produce Co.

Loading at the Side

An Adams Truck Used by Pittsburg Produce Co. is Fitted With a Removable Side Panel in Body

LOADING and unloading can be done from the side as well as at the rear, and thus the operation can be considerably hastened, resulting in far greater efficiency.

THE Pittsburg Produce & Fruit Co. has in use a 1-ton Adams truck, fitted with a special body, suitable to the service for which the truck is required. The length of the load-carrying space of this truck is 8 ft. 10 in., while the width of the carrying space is 3 ft. 10 in. The body is lined with galvanized iron, thus enabling the truck to be used for the haulage of ice at times, as well as for the carriage of produce and fruit.

The center panel of the body is removable, so that the truck can be loaded and unloaded at the side as well as at the end. Most of the loading is done in a rear alley, which is not allowed to be blockaded by trucks backed up to the pavement; consequently this special arrangement was adopted. The congestion of alleys in which loading operations take place is one of the chief drawbacks to the systematization of delivery. A motor truck very frequently has to wait quite a considerable time for vehicles to back into alleys and loading platforms, to load, and then to back out, before it can be backed up to the loading platform itself. Such an arrangement as a sliding panel in the side of the truck is a big factor towards the solution of the problem. Traffic will be free to pass the standing vehicle, and no annoying delays will be occasioned. When it is remembered that to get the greatest efficiency out of a truck it is necessary that it should be kept in work all the time, the consideration of such a loading arrangement for other vehicles should be well worthy of careful attention.

Cost Figures in a Dry Goods Co.

THE M. W. Tanner Dry Goods Company, Saginaw, Mich., has in service two 1,500-pound delivery wagons and two light delivery wagons that are used when either of the others are out of commission or when they are being repaired.

The number of packages delivered per year amounts to 45,000. Delivery of these by motor vehicle from July, 1911, to July, 1912, cost $3,400. The cost of each machine has been as follows:

Driver	$750
Jumper	156
Gasoline and oil	175
Repairs and new parts	625
	$1,706

Besides this cost a depreciation is taken on each truck of 20 per cent. a year. One accident has been met with that cost $500 to repair. This item is not included in the general expenses.

The majority of the streets in Saginaw are paved; the firm does not consider the motor truck practicable on country roads during the early season, late fall and winter unless the roads are graveled and drained.

During the previous year 35,000 packages were delivered with horses and wagons and the cost amounted to $3,200. The two trucks are capable of delivering 25 per cent. more packages than they are doing at the present time so their efficiency can be increased still more.

Activities in the Motor Truck World

The N. A. A. M. Truck Warranty—Electric Vehicle Association Formed in New York—Condition of the United States Motor Co.—Plan for Constructing Transcontinental Highway—Trucking Business for Boston

ADOPTERS OF N. A. A. M. WARRANTY

FOURTEEN truck manufacturing members of the National Association of Automobile Manufacturers out of thirty-three now making commercial vehicles have decided to adopt definitely the truck warranty recommended by the executive committee. Fourteen makers who are not members of the association have also adopted it. The following companies are the members who have adopted it: Baker Motor Vehicle Co., Federal Motor Truck Co., Gramm Motor Truck Co., Kelly Motor Truck Co., Knox Automobile Co., Locomobile Co. of America, Packard Motor Car Co., Peerless Motor Car Co., Pope Manufacturing Co., Reo Motor Car Co., Selden Motor Vehicle Co., United States Motor Co., the Waverley Co. and the White Co.

Those makers who have adopted the warranty but who are not members of the association are as follows: Auglaize Motor Car Co., Brown Commercial Car Co., Chase Motor Truck Co., Champion Wagon Co., Dorris Motor Car Co., Geneva Wagon Co., Gramm-Bernstein Co., Harwood-Barley Manufacturing Co., Hatfield Auto Truck Co., Kearns Motor Car Co., Sanford Motor Truck Co., Stewart Motor Corporation, U. S. Motor Truck Co. and Veerac Motor Truck Co.

The following members will adopt the warranty if a majority of truck makers do so: Nordyke & Marmon Co., Ohio Electric Car Co., Walter Motor Truck Co. and Willys-Overland Co.

The following non-members will do likewise under similar conditions: C. L. Barker, Bowling Green Motor Car Co., Chicago Pneumatic Tool Co., Dayton Auto Truck Co., Marathon Motor Works, Moreland Motor Truck Co., Poss Motor Co., Sandusky Auto Parts and Motor Truck Co. and H. E. Wilcox Motor Car Co.

TRUCK IN ICE DELIVERY

DEMONSTRATIONS have recently been made by the Kelly Co. with a 1-ton truck, for the Tennessee Ice Co. The experiment of house to house delivery was tried. The truck went to work at 3 o'clock a. m., and worked until 6 o'clock p. m., made 336 stops and the engine was running during the entire time except 30 minutes during lunch hour. The delivery was earlier and better than it was possible for teams to make, and cheaper, as it was made with one white man and three colored men, which took the place of three double teams and six colored men with one white man. At 6 o'clock the tank was filled up and it took just 5 gallons of gasoline to fill it, and 1½ pints of oil to replace the oil used.

NEW YORK ELECTRIC VEHICLE ASSOCIATION

A MEETING of the electric vehicle manufacturers and the central station interests of New York City held recently resulted in the formation of a co-operative organization known as the New York Electric Vehicle Association. Among other plans under consideration by the Plan and Scope Committee are the establishment of a common showroom to be centrally located and equipped with model charging facilities, and the maintenance of a list of duly inspected and reliable garages about the city, together with a catalogue of other similar useful information. The object of the new association is to boom the electric vehicle industry in New York City. This local association will in no way conflict with the Electric Vehicle Association of America, the national organization.

The membership of the association will consist of corporations and firms engaged in the manufacture and sale of electric vehicles, electric vehicle batteries, or electric motors, and corporations and firms engaged in the sale of electric current.

A NEW MOTOR TRUCK COMPANY

THE Brockway Motor Truck Co., located at Cortland, N. Y., has recently been incorporated with a capital of $100,000 for the purpose of manufacturing a line of popular priced commercial motor trucks of which three models will be made with load carrying capacity of 1,000 to 1,500 pounds, 2,000 to 2,500 pounds and 3,000 to 4,000 pounds respectively. The officers of the company are Geo. A. Brockway, president; C. S. Pomeroy, vice-president, and F. R. Thompson, treasurer and general manager. Geo. A. Brockway, the president of the company, is the president of the W. N. Brockway Co., of Homer, N. Y.

Every part of the Brockway motor truck, including its motors, will be built in the new, up-to-date motor truck plant, under the supervision of engineers, who for the past 10 years have devoted their time to perfecting a simple, powerful three-cylinder, two-cycle, air-cooled motor with which to make a practical commercial motor truck.

R. S. Reed is the chief engineer and superintendent of the company in which capacity he was formerly connected with the Chase Motor Truck Co. for 6 years.

UNITED STATES MOTOR CO. IN BANKRUPTCY COURT

NO reorganization plan has yet been adopted for the United States Motor Co., but it is understood that the terms of agreement will be arranged as speedily as possible. The partitioning creditor of the United States Motor Co. is the Brown & Sharp Mfg. Co., and the parties to the suit are the U. S. Motor Co., Alden-Sampson Mfg. Co., Brush Runabout Co., Columbia Motor Car Co., Dayton Motor Car Co. and the Maxwell-Briscoe Motor Co.

The liabilities of the company are estimated at $12,250,000 and the assets are estimated at $15,300,000. The liabilities consist of $6,000,000 of debenture bonds, and merchandise and banking claims.

The appeal to the courts does not indicate that the company will be terminated, in fact it is understood that under the receivership much delay and expense will be saved. The whole trouble has been due to lack of ready money. The state of plants which are almost shut down owing to lack of work is a serious matter and has an evil influence over the enterprise and spirit of progress which should prevail with all factory managers.

Developments with regard to the reorganization are proceeding slowly. There are two classes of creditors each of which can be subdivided and the question of reorganization depends on whether an agreement can be made between the various parties. Two courses are open under the present action. The first is a plan that will take care of the creditors and at the same time allow the company sufficient capital to proceed with manufacturing and selling products; the second is a sale under order of the court. With regard to the first, money could be raised by assessment of the present stock or by the sale of additional securities to present creditors in settlement of their claims or to outsiders in the open market. At any rate as yet the committee under which the plans of reorganization is being served has not come to a definite decision. It is generally considered that such plans of reorganization must be effected within a term of 90 days.

THE UNIVERSAL MOTOR TRUCK CO.

MR. FRED K. PARKE, vice-president of the Universal Motor Truck Co., Detroit, Mich., states that the Universal Truck Co., of New York, is a separate and distinct corporation and not in any way affiliated with the Michigan corporation which he represents, except as a selling agency for Universal trucks for which purpose it was organized. Owing to many misunderstandings the selling arrangement with the Universal Truck Co. has been annulled. From now on the Universal business will be conducted in New York as a factory branch of the Universal Motor Truck Co., of Detroit, at the new Universal service station and display offices at W. 63d street.

SALES MANAGERS' CONVENTION

THE Sales Managers' Convention was held at the headquarters of the Automobile Board of Trade on the 1st of this month. The following subjects were discussed: Freight, shipping, motor car equipment, enclosed bodies, selling and advertising, territory and discount and annual models.

A STONE TRANSCONTINENTAL HIGHWAY

AN announcement was recently made in Indianapolis and Detroit that a big movement had been started with the motor car and accessory makers in these cities to construct a stone transcontinental highway from New York to San Francisco, $10,000,000 being raised in the motor industry throughout the country for purchasing the crushed stone requisite for the purpose. Should this plan succeed it would mean a considerable increase in the delivery of goods by motor trucks between the towns situated along the proposed transcontinental route. A building of the road will be undertaken by state and municipal authorities and it is expected the sum will be raised by the first of next year. All moneys collected or subscribed for this will be used for the purchase of material. Approximately 2,200 miles of stone road will have to be constructed, there already being 900 miles of good roads not needing reconstruction along the proposed route.

A GENERAL TRUCKING BUSINESS FOR BOSTON

THE resumption of meetings of the Electric Vehicle Club of Boston recently, following the summer recess, brought up for discussion again the project that was under consideration last spring, the organization of a company by the local electric vehicle interests to carry on in Boston and vicinity a general trucking business. When first broached the plan was only tentative, but members of the club have been considering the project and making investigations as to the possibilities of business during the summer, and they consider the plan entirely feasible.

The idea is to raise $100,000 capital for the company, securing a part of it from the manufacturers of electric trucks, and with this capital install in Boston a large equipment of trucks of various sizes from light delivery wagons to heavy duty trucks, all electrically operated. With this equipment the company would seek contracts with merchants and manufacturers to do their trucking and delivery work on a basis similar to that upon which contract horse teaming is done, though with better service to the party engaging the electric service. The company, it is planned, would be able to undertake any kind of hauling from the delivery in the city and suburbs of small parcels from department and other stores, to the haulage of heavy freight between warehouses and factories and the transportation terminals of railroad and steamship lines.

It is intended that all the dealers in electric commercial vehicles who wish may participate in the company, supplying trucks for the work and taking a part of the capital stock. The Edison Co., which makes practically all the electric current used in Boston, is also indirectly interested in the project, though the Electric Vehicle Club is the promoter.

INCORPORATION OF THE DAHL CO.

THE Dahl Punctureless Tire Co. of America has been incorporated under the laws of the state of South Dakota with $6,000,000 capital stock, and this new concern will commence business at once with headquarters at 246 West 59th street, New York City.

It will take over the business which has been established and organized by the Dahl Punctureless Tire Co. of Minnesota, and will carry on and extend the business throughout the world. In connection with the manufacture of tire filler, this new concern will deal in a full line of novel automobile accessories and will manufacture and put on the market its own line of automobile casings, boots and other tire utilities.

CHICAGO MOTOR TRUCK PARADE

THE second annual fall opening of the Chicago Automobile Trade Association was ushered in recently by a parade of 70 motor trucks. The parade was 10 miles long and moved at the rate of 10 miles an hour taking 1 hour and 10 minutes to pass a given point. The truck parade was made up of machines privately owned and exhibited, being entered in fleets by dealers in respected makes who recruited single trucks and fleets of trucks from their customers.

SUIT AGAINST PIERCE AND CASE

THE Stevenson Motor Truck Co., of Milwaukee, Wis., recently filed a suit in the circuit court of Milwaukee against the Pierce Motor Co. and the J. I. Case Threshing Co., of Racine, Wis., charging them with violating an agreement whereby the Pierce and Case owners agreed to purchase the plant of the Stevenson for $100,000 worth of the capital stock of the Pierce company. The trial will, by mutual agreement, be transferred to Racine.

MOTOR HANDCARS ON THE LEHIGH RAILROAD

THE adoption of motor handcars for track work in place of the old-fashioned man-power handcar has been decided upon by the management of the Lehigh Valley Railroad. Forty-seven of the new cars have been ordered. Considerable saving in energy and time will be effected.

The type selected travels at a speed of from 4 to 20 miles an hour and it is so light that three men can easily lift it from the track to let a train pass by. It seats seven men comfortably and its motor is built to transport as many men and implements as the car will hold.

ALCO CORPS OF TRAVELING INSPECTORS

IN addition to the corps of commercial vehicle inspectors that each Alco agent has, the company has installed a corps of traveling inspectors, whose duty it is to cover both the pleasure cars and trucks that the company has in service throughout the country. The inspections are made at irregular intervals, and a campaign of education for each driver and owner in the care and operation of their vehicles is carried on by the men.

The Gasoline Vehicle

Reports from Dealers with Regard to Motor Truck Sales from August 15 to September 15

BUSINESS has been exceptionally good during this period and there seems to be very fine selling prospects for the approaching winter and the holiday season.

THE general opinion of gasoline vehicle manufacturers with regard to business conditions during the period from August 15 to September 15 is that business has been exceptionally good and that the future is bright with many prospects of big sales. There seems to be an increasing demand for the light truck, and companies that have heretofore been using heavy trucks seem now to be considering the merits of trucks of lighter capacity. The point, of course, depends entirely on the conditions governing the work that is to be undertaken by this new means of delivery. The coming fall ought to be a golden period for the motor truck industry in all parts of the country. Everywhere on the horizon are the signs that merchants are thinking, pondering out the inefficiency of horse-vehicle transportation, considering the expense of railroad freight rates, wondering whether or not a motor truck is worth the initial expenditure. The manufacturers give us the results of such cogitations.

Grand Rapids Outlook Very Good

THE GRAND RAPIDS MOTOR TRUCK CO., Grand Rapids, Mich., says that the general conditions of the commercial vehicle business are very much improved over a similar period in any year during the existence of the company, which is a period of 7 years. The increase in sales has not been in any special line of business during the last month; cars have been placed in sixteen different kinds of business. The outlook for October is very good, and it is believed that the company will have larger sales than ever before at this period of the year. The company only manufactures one size truck, namely, 1½ ton.

LIPPARD STEWART, Buffalo, business during this period has been very active and is even better than the month preceding, which was good. Inquiries received by this company have pertained largely to cars suited for department store delivery work and also for municipal purposes. There is a satisfactory amount of business ahead and present trade conditions are expected to be maintained.

THE INTERNATIONAL MOTOR CO., New York City, states that the general condition of business during this period has been decidedly better and more promising than the same period in 1911. Increased demands have been mainly in the produce and grocery business, the business handling perishable goods showing special activity. The outlook for October is most promising. Fall business is then beginning to approach its height and merchants are considering better transportation for the winter months. Trucks specially in demand throughout the summer months were those of 2, 3 and 5-ton capacity.

The condition generally in the commercial vehicle world for the past 30 days, in fact, 60 days, has been very encouraging, says the VELIE MOTOR VEHICLE CO., Chicago, Ill. More orders have been taken than for any 30 days during the past spring and summer season. The increased demand was in the 3-ton type. The outlook for the next month and the entire fall is bright. The company is quite certain that after the election many orders will be placed. Vehicles are being kept busy demonstrating and charge is being made for this work for business which will be placed this fall. The greatest business is believed to be the light delivery commercial vehicle; next, the 1-ton truck and the 3-ton vehicle. There does not seem to have been any increase in the 2-ton type. This, of course, applies entirely to gasoline vehicles.

With the FEDERAL MOTOR TRUCK CO., Detroit, Mich., the condition of the motor business has been very encouraging. Considerable more business was done than during the previous month, and from indications the demand is going to be on a steady increase from now. No particular line has been noticed as being in increased demand, distribution of orders appearing to be in the same sort of companies as heretofore. Federal agents, however, have an increased demand from foreign countries, especially on the continent of Europe. It is found with a great many companies such as meat packers and similar industries handling perishable goods that the tendency is getting towards lighter trucks. During the last month or so a number of trucks has been sold to concerns in these lines who have never before used a truck lighter than 3 tons.

Busiest Period in Career With Adams Co.

THE ADAMS BROS. CO., Findlay, O., has experienced the busiest period in their career, the factory working night and day to supply the demand. Trucks have been going into all lines of business. The outlook for next month is also very good, judging from the amount of orders now on the books. The sales during the present month over those of the same period last year show an increase of about 400 per cent. The demand is greatest for the 1½-ton truck.

In the opinion of the REO MOTOR TRUCK CO., Lansing, Mich., general conditions in the commercial vehicle business are improving daily. There have been many complaints from users of motor trucks, chiefly due to the fact that many pleasure car manufacturers have endeavored to use regular stock parts in constructing commercial cars; this, in the opinion of the Reo Co., has been unsatisfactory, as the service required from the two classes of vehicles is entirely different. Manufacturers are now beginning to realize this fact and are overcoming the weakness of their production of commercial cars by taking care of the parts which have given trouble. Experience shows that there has been an increasing demand in all directions, and there appears to be a great future for the light delivery wagon. Inquiries are increasing very rapidly for the small delivery.

The general condition of business with the LOCOMOBILE CO., Bridgeport, Conn., has shown a considerable improvement over that of the preceding year, but increased activity does not seem to apply to any one line. It is very probable that business during the next two months will be very brisk. The Locomobile Co. manufactures 5-ton trucks only.

Large Demand for Knox Tractors

Truck business from August 15 to September 15 with the Knox Automobile Co., Springfield, Mass., in connection with the regular commercial models, namely, the 2-ton to 7-ton trucks, has not been very brisk, but there has been a very large demand for Martin tractors which made the company's business for the month greater than that of the preceding month. Most of the tractor orders came from firms in the contracting road building business. At present there is a very good outlook for sales next month. There have been more commercial vehicle orders received from September 15 till the present date than there were during the corresponding period of last month. The increase for this period was considerably larger than for the corresponding period of last year. Outside of the demand for tractors, which is the greatest, there was a larger demand for the 2- and 3-ton models than for any others.

Trucks for Mining

A Use to Which the Truck May Be Put Saving Both Time and Money in Many Ways

MINES being invariably situated in inaccessible districts, the question of a cheap and always reliable means of transportation is a most important and vital one.

THE question of the use of the motor truck in connection with mining is one that should be duly considered both by truck maker and mine owner. Mines are nearly always situated in wild parts of the country, in mountainous districts, often at a very far distance from the source of supply and the distributing base for the product of the mines. Transportation at low cost is the thing that is wanted. Freight rates by rail are heavy. Railroads are not elastic and cannot be bent to suit the requirements of certain mines situated in various out-of-the-way districts, and in addition railroads cannot be fitted into a systematic method of delivery. In many cases the output has to be regulated by the delivery service, not the delivery service by the output, as it should be.

Some remarkably interesting figures have been obtained by the International Motor Co. in this connection showing the work done by a 6½-ton Saurer truck that has recently been installed by the Arizona Southwest Copper Co., of Yucca, Arizona. The work of this truck consists in hauling from Copperville to the Santa Fe Railroad Station at Yucca, a distance of 27 miles, thus forming a connecting link between the mines and the railroad service. It is used for hauling supplies as well as the product, and during the first two months that it was in use the hauling cost for carrying heavy machinery and supplies to the mine was reduced from $15 per ton to less than $5. No result could be more eloquent with regard to the merits of the motor truck.

Work Done by the Truck

The present truck is the outcome of several months of selection. Others had been tried, but did not give the satisfaction now experienced with the Saurer truck. Between Yucca and the mines it is making trips strictly to schedule time, and such a performance comes quite as a revelation to the mining men of the district. The road is by no means an easy one over which the truck goes. The first 15 miles consist of a steep upgrade over desert roads intersected by a great number of deep sand washes, very hard going for a heavy truck such as the one in question. Nevertheless, such obstacles are successfully overcome, even when the truck is fully loaded to its utmost capacity. The load gear is seldom used in going through this desert road. Following this is a steep 7-mile run up the Wallapai Mountains, which is made by the truck in about 2½ hours, climbing grades from 10 to 15 per cent. On this stretch of road the load gear is used exclusively.

Perhaps the greatest surprise to men who have witnessed the work of this truck is the fact that, although under full load along this truck, there was no sign of overheating.

The last 5 miles of the run is a down-hill grade of from 6 to 8 per cent. to the mines. The surface of this part of the road is fairly good, in fact, all the way there are no bad road conditions encountered; as a result, the Goodrich tires with which the truck is equipped show very little signs of the hard wear they undergo, although they have up to the present run over 3,000 miles.

As soon as the company has its mill in operation the run will be different, the truck only having 5 miles upgrade when carrying full load, and practically 22 miles down grade to the railroads. This will show even better results thar those already experienced.

In hauling lumber and supplies to the mine, the round trip of 54 miles was easily made in one day, but as the loading and unloading of the heavy machinery had to be all done by hand, the average time during the first month was 1½ days for round trip.

Operating Figures of Truck in Mining Service

The company has been paying $15.00 per ton on this haul and it took four days to make the round trip with horses. The following operating figures have been taken as an average the first month for round trip.

Gasoline, 19 gallons @ 30c	$5.70
Oil, 5 quarts @ 20c	1.00
Grease, 1 pound @ 12c	.12
Driver, 1½ days @ $4.00 per day	6.00
Total visible expense	$12.82

No repairs whatever have been made on the truck. The upkeep expense is given at the following figures:

Interest on Investment @ 6% and Insurance for 1½ days	$2.11
Depreciation @ 10%	2.67
Repairs	2.25
Tires	2.83
	$9.86

Total cost per round trip, hauling 5 tons one way, $22.68; cost per ton, $4.53. Former cost per ton hauling with teams by contract, $15.00, showing a saving per ton of $10.46. The saving to the company on each as compared with former hauling cost is $52.30.

Mr. Hoffman, manager of the Arizona Southwest Copper Co., figures that with the completion of the mill and hauling ore to the railroad, as well as hauling supplies back to the mill, he will reduce his cost per ton to less than $4.00. Five Saurer trucks will be used to take care of the transportation problem of this company. The Saurer truck has proven to be really capable of standing the terrific punishment to which it has been subjected in this service, over sandy roads, climbing steep mountain grades, and encountering all kinds of rough wear and tear. These obstacles have all been successfully overcome.

The good results otained from the Saurer truck in this work are principally due to the fact that a special study has been made by the makers of the truck of this particular service. In every industry conditions of operation are different. Complete satisfaction can only be given to a buyer by a machine that has been specially constructed to meet with the special work for which it is to be used. A man should not purchase a light delivery electric vehicle for work in an open and rough country. Neither should a powerful gasoline truck be used for delivery in districts with asphalted streets and wood pavements where power can be wasted.

The Owner Must Analyze Conditions

The owner of a mine must estimate exactly the requirements of his delivery system. He must analyze conditions. This analysis given to the truck manufacturer will serve as a guide to that special construction mentioned above. The owner is the best man to figure his delivery problem; the truck maker is the best man to figure out the correct solution. This refers not only to a mining business, but to all businesses.

Trade Conditions Throughout the Country

A Summary of the Position of the Motor Truck Industry In the Principal Cities of America

THE general position of the industry is good. Reports from all the big cities show that sales have increased considerably during the last months, and although in many towns the position has been quiet and not above normal, there is in nearly every case a very bright prospect for the fall and winter. Retailers are showing a growing interest in the motor truck.

IT appears that movements are being made in many of the more important cities, such as Boston, for instance, to facilitate motor traction. This spirit shows a complete renaissance of ideas with regard to the systematization of delivery throughout the country. The winter is the herald of the motor truck; climatic conditions necessitate improved delivery.

Good Prospects In New York

NEW YORK CITY, N. Y.—A decided increase in the sale of motor trucks in New York City for the past month is reported by the local dealers. It is believed by the dealers that this increase is due to the approach of the holidays, many merchants becoming convinced that the adoption of motor trucks in their delivery service must come sooner or later and it is better for them to have the new vehicles a considerable space of time before the holidays so that the delivery service will be running smoothly by the time the rush of holiday business begins.

There have been a large number of reorders also, and, although some of the dealers state that August was one of the biggest months of the year they are all very optimistic in regard to the prospects for October.

This demand for commercial motor vehicles comes from a great number of different lines of business, but among those most prominent in point of numbers purchased are the express companies, department stores, groceries and contracting companies.

The buying of the trucks is not confined to any one particular type of vehicle, the electric and gasoline vehicles of high and low price being equally in demand.

Effect of Increased Boston Retail Business

BOSTON, MASS.—The remarkable expansion in the retail business in this city which has taken place with the beginning of autumn, and which has brought with it the expansion of no less than four of the city's large stores, has had its good influence upon the commercial motor vehicle trade. Boston dealers in delivery wagons and trucks says that the spreading out of the big stores not only has had a direct effect by increasing their needs for motor vehicles with which to handle their deliveries, but that it has stimulated the demand indirectly, causing other stores, both large and small, to show increased interest in improving their methods of transporting freight and handling parcels. The motor truck business consequently is entering upon the fall selling season well satisfied with the prospects.

The big electric show which opened on September 28 included a very large display of electric commercial vehicles of all sizes and kinds and also a model electric garage, together with a factory display of battery manufacture and charging and various other things relating to the commercial vehicle, as well as to all other phases of the application of electricity. This has stimulated the dealers in electric vehicles to renewed energy. They are making displays in the show so comprehensive that it is claimed that the exhibit of electric vehicles alone is the largest that ever has been made. The dealers in electric vehicles also are enthusiastic over the prospect of a reduction in the price of current which will make them still better able to compete with the gasoline car dealers for business. The Electric Vehicle Club has under consideration a plan for a big co-operative electric garage and also a plan for a general trucking company.

The Commercial Motor Vehicle Dealers Association directors held a meeting recently at which they considered informally the plans for the commercial vehicle show next spring. The principal item of business was, however, the election of a president to succeed C. F. Whitney, who has resigned owing to his retirement from the business. J. S. Hathaway, manager of the White Co., a Boston branch, was elected president of the association. He was previously a director and is vice-president of the Automobile Dealers Association.

The White Co. will before long begin work on a new building on Commonwealth avenue which is made necessary in part by its increasing truck business, which has crowded to the limit its present Newbury street quarters. An interesting incident showing the development of the motor trucking business is the engagement by this company of Captain Harry G. Chase, a Professor of Physics at Tufts College, as a part of its sales staff. Professor Chase is considered an authority on motor trucks. The Autocar Co. has reopened its school on Beacon street.

The movement to obtain better facilities in Boston for the parking of motor vehicles, including trucks, reached the stage recently where it was considered officially by the street commissioners at a hearing. The commercial vehicle interests ask that certain squares and streets be set apart where trucks and delivery wagons may stand for a longer time than the 20 minutes allowed under the present street traffic rules. The Highway Commission has taken a census of road traffic throughout the state and has made a special count on all the state highways of commercial motor vehicles. As there were considerably more than a hundred stations at which daily counts were made for a period a 7 days, a great mass of data was accumulated, which has not yet been tabulated, so as to show the results. When these are available it is expected that they will throw much light upon the distribution of merchandise by motor in this state. The commission had registered up to August 31 a total of 3,560 commercial vehicles, against 2,189 for the same period last year.

Many Single Trucks Sold In Philadelphia

PHILADELPHIA, PA.—The volume of business is substantially greater than for the preceding month or the same period last year. The fact that this year shows a steady increase on the same period last year demonstrates the solid foundation upon which the industry rests. So gratifying has been the interest displayed and the inquiries received during the past month that some dealers assert that business is better at the present time than it has been since the first of the year.

In connection with present sales activity it cannot be said that the sales are confined to any one make or type of car; the prosperity is general. Most dealers are willing to confess that business was not up to expectations during the heated months, sometimes more quiet than it should have been, but no uneasiness was experienced on this account, efforts being concentrated on the fall trade. In some instances agents are still swinging around the circuit of the county fairs giving demonstrations and booking a fair share of trade.

A majority of sales is of single cars. Only a few fleets have been sold. The International Motor Co. reports sale of eight 2-ton trucks to the Freihofer Bakery, and future prospects are bright, although there seems to be a slight tendency upon the part of big purchasers to hold back pending the outcome of the Presidential election in November.

The Ford Motor Co. has disposed of four vehicles to Jacob Reed's Sons, two to the United Gas Improvement Co. and a baker's dozen to the city, the latter for the use of district engineers, bureau chiefs and fire marshals.

The Chase Motor Truck Co. has also sold a fleet to the United Gas Improvement Co. and has inquiries for more.

Pittsburgh Sales 50 Per Cent. Larger Than in 1911

PITTSBURGH, PA.—It is learned that the total of 1912 sales to date is at least 50 per cent. larger than that of 1911 in this city. Some concerns report more than double the number of sales. Heavy purchasing has been made by the superintendent of city supplies; the commercial truck is a saving proposition for a big city even where there are steep hills and narrow streets. Already more than a dozen trucks have been bought for police, fire and public departments.

The striking feature of the truck situation in 1912 is the number and importance of the new buyers. Hitherto buying has been confined largely to the big brewing companies; cold weather, however, has hit these companies hardly and other companies are now entering the field in their stead, especially fruit commission men, wholesale groceries, retail groceries—who are doing away with one-horse delivery wagons and substituting 1-ton and 1½-ton trucks—and department stores.

Prospects for fall and winter trade have never been so good. It is probable that during the next 6 months there will be the biggest truck buying movement over seen in this city.

No Records Broken in Baltimore

BALTIMORE, MD.—Dealers of commercial cars in this section have no hesitation in saying that for the period from August 15 to September 15 no great records in the way of sales have been broken. This does not mean that they wish to convey the impression that business is on the slump, but that due to the many vacations prospective buyers have held off from making purchases and consequently the usual late summer slackness prevailed. Future prospects for the trade, however, are the best that have ever turned up this time in any previous year.

The street and road conditions are slowly but surely getting better in this territory every day and this means much for the future of the trade, with the result that all dealers here of commercial cars are optimistic.

The city departments are well supplied with motor vehicles, there being six in service at present. Plans are being prepared for changing No. 32 horse drawn fire engine into a motor driven vehicle. This will no doubt be a Mack conveyance like the other in the department, although the fire commissioners have not fully decided on this question.

Industry Rather Quiet in Washington

WASHINGTON, D. C.—The commercial vehicle business has been rather quiet during the past 30 days. Nearly all the agencies have made at least one or two sales of trucks. The Star Laundry Co. finally gave its order for delivery cars to the Little Giant agents. Mr. Brice, the manager, says that these will displace eight of his teams, and allow him to give much better service to his customers. His experiments have not shown how much if any he will save in expenses, but he will be satisfied with better service.

Dealers will not soon forget the Labor truck parade. They say that it will result in much good to the business.

Toledo Truck Users Increasing Largely

TOLEDO, O.—Commercial trucks are increasing here every week. Nearly all the large retail houses are now using motor trucks, while not a week goes by but new concerns are interested. Brick manufacturers are now using the truck almost exclusively and many Toledo piano dealers are finding the truck the best means of handling instruments. The Whitney & Currier Co. has been using trucks for piano delivery for a number of years and recently purchased a small truck to be used for light deliveries. For larger and heavier instruments the concern uses a special truck secured for the purpose by the Moreton Truck & Storage Co. The truck has been a complete success. The motor truck is much more economical for long hauls and in short hauls has many features to recommend its use as against the horse-drawn vehicle. The truck is forcing its way into lines where the horse has seemed to be firmly intrenched, an instance being the use of trucks by produce and market gardeners. The Willys-Overland Co. recently sold a 3-ton Gramm truck to H. A. Winheim for use on a St. Louis, Mo., truck farm. His haul is about 20 miles. He formerly used several two-horse teams, each requiring a full day to make the trip. One truck now accomplishes this work and gets the produce to market in much fresher condition, enabling him to secure much higher prices than formerly. He is also able to reach the market earlier than others using horse-drawn vehicles and thus has the pick of customers. The cost of operation and up-keep with the 3-ton truck has been less than that of the horses formerly used.

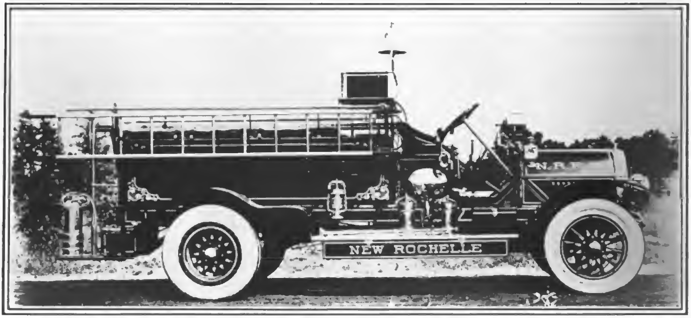
Prospects in Syracuse Encouraging

SYRACUSE, N. Y.—The commercial truck situation in Syracuse and central New York state generally is encouraging, the past season having been the best yet experienced, according to a poll of the various agents here. Business men are gradually awaking to the possibilities. The lighter vehicles are in particular favor and many farmers are investing, also the contractors. Many of the heavier machines are now used hereabout on the good roads and barge canal work that is now in progress. The outlook is bright.

Fine Season Beginning in Louisville

LOUISVILLE, KY.—There is no doubt that one of the finest fall seasons that has ever been experienced by the commercial vehicle industry in this city is now opening. One of the most interesting features of the situation is the climatic change which is becoming apparent in this section of the country. Cold winters and hot summers are the general conditions; consequently the most perplexing features of delivery are present all the year round. This tells badly on horse delivery and the coming winter promises to be a fine one for truck selling. Big and little trucks alike have been sold to many kinds of users, both in the city and in the country surrounding. Wholesale grocers, tobacconists, iron workers and other handlers of heavy freight are buying strongly.

MUNICIPAL SERVICE EXTENSIONS



Knox Combination Chemical and Hose Fire Truck Recently Purchased by the New Rochelle Fire Department

Triple Combination

Paper Read by F. J. J. Connery, New Castle, Pa., Before the International Association of Fire Engineers

THE question whether the triple combination, hose, chemical, and pump, is a success, was the subject of the paper read by F. J. J. Connery, chief of the New Castle, Pa., fire department, before the International Association of Fire Engineers.

He prefaced his paper by remarking on the astonishingly rapid advance and change in fire fighting equipment from horse to motor-propelled apparatus. This has led to the adoption of many styles of equipment, and each of these styles is now under actual test; the fittest will be the one that survives, and this will become the recognized standard.

He stated that the triple conbination is the piece of apparatus now furnishing the greatest facilities for fire fighting, combined in any one-piece apparatus. Consequently it should be of great interest to those fire departments where economy is necessary.

The triple combination does not include the ladder, although such wagons are always equipped with ladders of sufficient strength to reach ordinary buildings in small cities, as well as the scaling ladder for use where the smaller ladder is insufficient. The combination thus affords a complete fire fighting apparatus, including smaller tools and light equipment, in one single wagon. It fills a big want in a city of small size.

The great objection, he considered, is its massive weight, ranging from 5 to almost 10 tons, and it is the duty of all manufactrers of such apparatus to give their most careful consideration to the reduction of weight in such a wagon by introducing better materials and more careful workmanship in construction, rather than making a machine too light to withstand heavy service. The machine must be heavy but not necessarily cumbersome and unwieldy.

When purchasing a triple combination, the most important point to be considered is the nature of the ground to be covered, as to hills, paved streets, etc. Light machines will give better service on smooth good roads, whereas a heavy machine is necessary for unpaved streets and steep hills. The suggestion was made that manufacturers should give counsel and advice as to these points influencing the choice of a machine.

The Questions of Power and Tires

The question of power is governed by the weight of the machine and the kind of ground over which it is to be used. and should be in excess of that actually required so that in transportation of apparatus more power can be developed for emergencies than is necessary in the ordinary course of usage; excess power also saves strain, and is of value in using the pump, avoiding strain there, and giving better service when throwing water for a long period of time.

The weight of the triple combination precludes the use of any other tires than solid, and the block solid seem the best. What is wanted is a solid tire with some degree of resiliency, more nearly approaching the pneumatic. Unquestionably this matter is one for serious consideration, as most trouble now experienced could be avoided by a reduction of vibration. Solid tires likewise reduce speed and consequently efficiency.

The opinion as to the best type of pump is about equally divided between the piston and the rotary, although not much information is forthcoming as to the superior qualities of each over each. Mr. Connery's own experience has been solely with the piston pump, and this has proved most efficient and satisfactory, exceeding all claims made for it by the manufacturers. He considered that it is more efficient in maintaining an even pressure through long service than the rotary.

Everything Ready to Hand

With the triple combination wagon, immediately the fire alarm is sounded, everything necessary to fight the fire is at hand. If there is a small fire there is the chemical, in almost as large a quantity as carried by a separate chemical wagon. If the water hose is necessary it should be in as great quantities as carried by the hose wagon alone, and there is the additional advantage of a set of pumps ready to use with the hydrant, cistern or river, with as much power as the steamer, and superior to the steamer in maintaining a steady flow of water through a long and continuous period of service.

There is also an equal amount of ladders to that carried on any combination wagon.

Mr. Connery gave an example of the uses of a Knox triple combination hose, chemical, and pump wagon, manufactured at Springfield, Mass., and put in use in New Castle, Pa., in October last. Thus it has been in active use for a year.

The business part of New Castle is built on the flat at the junction of two rivers, surrounded by hills, which almost appear mountains. These hills are covered thickly with residences a mile and a half out from the center of the town, in every direction but one which is the south of the center of the city and along the river formed by the junction of the two streams. Here lies the railroad and manufacturing district, and the central hose house where the triple combination is stationed is in the center of the business section, down town. Consequently every alarm outside the business district necessitates a heavy climb.

The whole of this territory is being covered by the triple combination with the assistance of two hose wagons, situated respectively half a mile north and one mile east on the hills. Each is horse drawn.

Immediately a fire alarm is given, the triple combination and the horse wagon in the special district start out at the same time. Experience has shown that the motor apparatus covers four times as much ground as the horse apparatus, even on the hills, and is nearly always at the scene of operations first.

The wagon weighs about 7½ tons when loaded and carrying 8 men. It is drawn by a 70 horsepower gasoline motor, and is equipped with a 40 gallon chemical tank with 150 ft. of chemical hose in basket carrier, 1,000 ft. of 2½ in. cotton jacket hose, with room for 250 ft. more. Piston pump No. 8, made by the Knox Company, is used, and the following are also carried: one 24 ft. extension ladder, one 14 ft. scaling or roof ladder, two 3-gallon fire extinguishers, axes, lanterns, pipe holds, crowbars, etc. The Kelly solid block tire is used, with chains of the fire department's own manufacture on both front and rear wheels.

Going into service on October 23, 1911, the machine has answered since then 123 alarms, traveled 786 miles, used 739 gallons of gasoline, at an average expense for minor repairs, gasoline, oil and other incidentals, of $7.50 to $8.00 per month. It has been ready for service every minute with three exceptions, when wating for minor repairs from the factory, and not exceeding in all 72 hours. Had the parts been on hand a very few hours alone would have been wasted. It is considered advisable in view of such cases to have spare parts on hand.

The Pump Has Never Failed to Respond

The machine can make 30 to 35 miles per hour on the level easily, and from 10 to 15 on the hills. The pump has never failed to respond, even for a continuous use of 2½ hours at one time.

Mr. Connery is firmly of the opinion that the triple combination is a success from actual experience with the results outlined above.

New Federal Combination Fire Chemical and Hose Truck Equipped with the Latest Improved Fire Apparatus

Three Tests of the Efficiency of the Motor Fire Engine Recently Carried Out by the Robinson Fire Apparatus Mfg. Co., St. Louis

Knox Combination Truck for New Rochelle

NEW ROCHELLE, N. Y., has placed in operation one Knox combination chemical and hose fire truck, shown in the illustration on page 46, and one Knox flying squadron machine. The combination truck is equipped with one 40-gallon chemical tank, while the body has capacity for 1,200 feet of 2½-inch water hose. The body is arranged with lockers along each side in which firemen carry special fire clothing. The chassis consists of 40-horsepower 4-cylinder motor, mounted on standard Knox fire chassis, with special heavy three-speed transmission and chain driven to rear axle. The machine is a powerful hill-climber. The flying squadron will carry about twelve firemen and is to be used in connection with the police department to rush men to fires, to keep back crowds and assist firemen in their work. It is equipped with one hand extinguisher and special fire tools. These cars are the first motor apparatus to be installed in New Rochelle, but that city now is considering entire motorization.

Testing the Motor Pumping Engine

IN view of the interesting and valuable paper reprinted elsewhere in this issue on the efficiency of the motor pumping engine, read by Geo. W. Booth before the Annual Convention of the International Association of Fire Engineers, the following figures with regard to tests recently made of motor pumping apparatus are of value:

Several tests have recently been carried out of Robinson motor fire engines, manufactured by the Robinson Fire Apparatus Mfg. Co., St. Louis. The results of some of these trials are extremely interesting, affording considerable light on the efficiency of the motor fire engine.

At Peoria, Ill., the machine tested pumped 680 gallons of water per minute for three consecutive hours, at a pressure of 150 pounds. Two streams of water were siamesed into a deluge, and under a pressure of 230 pounds were forced 200 feet into the air. The truck used in this test has a 6-cylinder motor which develops 110 horsepower.

At Atlantic City another test was recently held, lasting for three hours. A 1¼-inch nozzle was used at first, and at a pressure of 135 pounds the engine threw 536 gallons per minute. With two streams siamesed into one, under a pressure of 60 pounds, 704 gallons were pumped per minute. The record throw was achieved with a "deluge" set, consisting of three lines of hose coupled to a 2-inch nozzle through which the stream is thrown. With a nozzle pressure of 65 pounds 958 gallons of water were pumped with this arrangement.

The above illustrations show the remarkable height to which the streams of water are thrown by the motor engine.

Motorizing the Akron Fire Department

THE city of Akron, O., has recently advertised for bids for the following kind of motor driven fire apparatus:

One 85-foot aerial hook and ladder truck.
One combination hose wagon (chemical and hose).
One triple combination wagon (chemical, hose and ladder wagon).
Three triple combination wagons (pump, chemical and hose).
One tractor, to propel a 65-foot Seagrave hook and ladder truck.

The horse drawn apparatus which the motor driven apparatus will replace is to be sold as soon as the motor driven apparatus is placed in service.

After placing the above motor apparatus in service, there will be twelve pieces of motor apparatus and one horse-drawn piece in service. In a short time it is hoped that one or two more motor driven pieces will be purchased to replace the one horse drawn piece at present left.

The installation of motor fire apparatus will not involve the reconstruction of the sub-station districts at present, and it will not be necessary to do that until new fire stations are constructed to replace any of the old ones. The chief of the fire department is satisfied that by installing motor fire apparatus the efficiency of his department is increased at least 50 per cent., and the maintenance expense is decreased about 75 per cent. It will not be necessary to construct additional fire stations for some time to come, but if compelled to keep horse drawn fire apparatus in service, it will be very necessary to add and construct at least two more fire stations at once in order to be able to give the citizens of Akron only reasonable fire protection, as the city is rapidly growing, with a population of about 100,000 at the present time.

Ninety-Eight Thousand Dollars Spent by Chicago

THE following table shows the amount spent to date by the fire department of Chicago for motor fire apparatus:

1 pumping engine, built by Nott Fire Engine Company	$11,50
1 pumping engine, built by the Webb Co.	7,90
23 combination chemicals and hose wagons (17 built by the Harder Auto-Truck Co., 3 Mais cars built by the Davies Commercial Car Co., and 3 built by the Robinson Fire Apparatus Mfg. Co., St. Louis)	67,5
3 squad wagons, built by the Harder Auto-Truck Co.	10,65
	$98,0

As fast as motor apparatus is installed the horse drawn apparatus is sent to outlying stations to take the place of other apparatus.

New Federal Combination Fire Truck

AFTER several months of investigation and experiment the Federal Motor Truck Co. has placed on the market a new combination fire chemical and hose truck. The truck has been designed in accordance with the demand. The

Municipal Market Possibilities for American Commercial Vehicle Makers

Venice, Cal., is considering the installation of motor fire apparatus

Bids are being received by Inglewood, Cal., for another motor combination double-tank chemical fire engine.

Los Angeles, Cal., has advertised for bids for a motor-propelled combination chemical and hose wagon and motor-propelled tractor.

Bids have been received by the council of San Bernardino, Cal., for two automobiles for use in the fire department.

E. Peoria, Ill., is considering the purchase of a motor fire truck.

Milwaukee has voted to purchase its first two pieces of motor fire apratus. Bids have been asked for two combination hose and chemical trucks.

Bids were recently opened by the council of New Castle, Ind., for the purchase of two motor combination hose and chemical wagons and runabouts for the chief.

Cedar Rapids, Ia., is considering the purchase of motor fire-fighting apparatus.

A runabout has been purchased for Chief Reinfriend, of the Dubuque, Ia., fire department.

Dubuqoe, Ia., recently purchased a motor fire truck.

Cairo, Ill., is considering the purchase of motor fire apparatus.

Dayton, O., is to have three motor-driven combination chemical wagons, one motor patrol and three motorcycles for the police department.

A contract was recently closed for a motor fire engine for Karlstad, Minn.

Akron, O., is considering the installation of motor fire apparatus.

Dayton, O., has purchased three combination chemical trucks, contracts being awarded the American LaFrance Motor Car Co.

Dayton, O., recently received bids for a motor-driven patrol wagon.

Harrisburg, Pa., has purchased motor-driven fire apparatus.

Lebanon, Pa., is considering the purchase of a motor-driven hose wagon.

San Antonio, Tex., will purchase two hook and ladder trucks and another fire engine. The apparatus will be installed this month.

Wilmington, Del., has purchased a motor combination fire engine, which makes the fifth this city has.

Gaffney, S. C., has purchased a motor fire truck and hose wagon, and both to be equipped with chemical engines.

The purchase of a combioation ambulance and patrol is being considered by Dallas, Tex.

Waco, Tex., is considering the purchase of a combined motor hose wagon and pumper.

Rice Lake, Wis., recently purchased a combination hose and ladder truck.

Warren, N. Y., is considering the purchase of a combination chemical and hose wagon.

Utica, N. Y., is in the market for three combination chemical and hose wagons.

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body is mounted on a standard Model "D" chassis and is equipped with all the latest and most improved fire apparatus obtainable.

The car is equipped with side seats and brass "grab" rails running around the entire edge of body. The body can easily accommodate 1,000 feet of regulation 2½-inch hose, some of which is on reel, thus enabling an instant delivery of 300 or 400 feet of hose. Two 25-foot extension ladders are placed one on each side of the body where they can be hurriedly swung off and hoisted. A 35-gallon "Badger" chemical tank with connection for hose from hydrant, and 200 feet of ¾-inch chemical hose with a brass nozzle are placed "out of the road" just behind the driver's seat. Two 5-gallon hand fire extinguishers in brass receptacles are securely fastened on the right hand running boards. Two 5-foot crowbars, one "Detroit" door opener, two fire axes, two 10-foot plaster hooks or pike poles and four "Tine" hooks are handily distributed throughout the car. On the left hand running board is the tool box, and in the rear are placed two spindles for the purpose of holding the hose nozzles upright.

Elevated several feet above the truck bed is a wire basket containing 200 feet of cotton hose and to which are fastened two "Dietz" hand lanterns, one on each side. A powerful pivot search lamp is mounted on the center of the dash board in convenient reach of the operators; there are also two side oil lamps.

The average speed of this outfit, which can also carry eight men beside the two operators, is 22 miles per hour, about twice as fast as a team-drawn wagon. The equipment is complete and everything is arranged that operators may have the quickest action possible.

The painting is as desired, gold leaf used on all scroll work. Swinehart cellular tires are used.

Trucks for Hauling Garbage in Toledo

COUNCIL recently authorized Service Director Cowell to expend $9,000 for the purchase of two 5-ton auto trucks to be used in the street department for the purpose of hauling garbage from the collecting stations to the reduction plant. These machines will be expected to do the work of six teams, thus increasing the collection facilities which are at the present moment inadequate to meet the demands of the department.

There is a big opening in municipal markets for trucks that could be used for such work. In all branches of municipal service the motor truck seems the ideal machine, and it is in municipal work that such great saving of cost is noticed. The reason for this is that municipal work of all kinds is invariably and necessarily organized. Consequently, the motor truck is able to fit in with the systems in operation.

An Automobile Street Sprinkler in St. Louis

RECENTLY there has been purchased by the company that has the contract for the sprinkling of St. Louis streets an automobile street sprinkler and its operation to date shows that there is a saving of from 30 per cent. to 40 per cent. when compared with the cost of sprinkling with teams. This tank, which is mounted on a 6½-ton Saurer chassis, carries 1,400 gallons of water and the pressure pump with which it is fitted will spread 400 gallons per minute. The sprinkler is controlled by one lever, which will operate the two nozzles at the same time or each independently. These nozzles are adjustable so as to cover a street from 30 to 90 feet in width.

The sprinkler, shown in the accompanying illustration, is taking the place of from three to five double teams and drivers.

Automobile Sprinkler in Use on the Streets of St. Louis, Where It Has Recently Been Installed

Buffalo's Second Motor Combination Chemical and Hose Fire Truck Delivered by Victor Motor Truck Co.

Selling Commercial Vehicles on Credit

The Views of Leading Dealers and Manufacturers on a Matter Which Will Ultimately Affect the Whole Truck Industry—The Small Merchant Wants Motor Trucks, but How Can He Get Them?

THIS important point is viewed from quite different standpoints by the truck dealers of this country; many are in favor of an installment plan, some already allow credit, others conduct all business on a strictly cash basis, thus excluding the small merchant. Yet the small merchant is the man with ambition, and the motor truck is the shortest cut to efficiency of delivery and extension of business. Manufacturers should understand that the small merchant will buy if he is allowed to, but he cannot afford a big initial expenditure.

The following question was sent to truck dealers: Are you having much difficulty with small merchants, such as retail grocers, laundries, etc., who would like to buy motor vehicles but have not the ready cash and want some form of easy payment? If so, how are you handling the situation, and do you believe many sales could be made if a standard time payment arrangement were adopted?

56 replies received.
21 give credit.
20 sell on cash basis.
16 in favor of installment plan.
7 do not think it would be successful.
4 favor limited time.
8 who have not yet encountered problem.

ONE great difficulty to be met in the sale of commercial vehicles is that of selling on credit. This is occasionally necessary, especially with the smaller class of merchants who have not the money on hand to pay cash for a truck. The commercial car dealers and manufacturers have been dealing with this situation as it arose and each has a different way of handling it, some giving credit and others making it a rule to make nothing but cash sales.

That it might be determined whether a standard time payment would not be of benefit to the industry, THE COMMERCIAL VEHICLE wrote to the leading dealers and manufacturers to get their views of the situation. There have been fifty-six replies to the question printed above and a review of them all shows a very complex problem. Those that give credit are in the lead in numbers, as there are twenty-one who make arrangements with their customers when occasion arises to make payments at different intervals. On the other hand, twenty dealers and manufacturers adhere strictly to the cash payment basis of making sales. Comparatively few seem in favor of a standard time payment arrangement, there being only sixteen who thus expressed themselves. There are seven who do not believe that any plan of this kind would be successful in view of the fact that each credit sale presents a different problem, and there is one who does not think that this arrangement would be wise. Most of the dealers and manufacturers did not give an opinion on a standard time payment arrangement. There are four who are in favor of a limited length of time for credit payments, eight who have not been called upon to solve the problem and one who believes that the condition will gradually disappear as business increases. There is one also who occasionally meets this proposition of selling to the smaller class of merchants, but has had no difficulty as yet. The various answers to this question follow:

A Curse in the Industry

BOSTON, MASS.—Another curse to the motor truck industry in the selling of cars is that some of the very largest concerns in this district have sold and delivered to our absolute knowledge—affidavits furnished if necessary—3½-ton trucks for $300 down and the balance of the money any way they can get it. This is even worse than ever happened in the agricultural implement business.—H. B. Pruden—New England Branch KisselKar.—KisselKar.

NEW YORK CITY.—We have not had much difficulty with small people, as we do not at present encourage this class of business. Our product as you may know is limited and we also feel that if a man has to strain himself severely to pay for a truck the chances are that he will not spend the necessary money in keeping it up; but we do believe that with responsible people who have the necessary assets, although not the cash in hand, it is entirely proper to accept notes in payment for a truck. But the notes should not extend over too great a time, for reasons you can well imagine. —R. C. Reid—Harrolds Motor Car Co.—Pierce Arrow.

Only Sell for Cash on Delivery

PITTSBURGH, PA.—We sell to no one except for cash on delivery. As a rule merchants who have not sufficient capital to pay for a truck outright are likely to run a truck to death and not make the necessary expenditure to keep the truck in proper running order.—H. Howard—Packard Motor Car Co., Pittsburgh.—Packard.

CAMBRIDGE, MASS.—There is a great demand for easy payments and the company that gets the right method of taking care of this demand will surely reap a harvest.—A. H. Harrington—Dodge Motor Vehicle Co.—Commer and Pope Hartford.

BOSTON, MASS.—Of course merchants would be very glad to buy trucks if they had the required amount of money. My experience has been that people who have sufficient business to warrant a truck in most cases have been able to pay for it or make arrangements with a bank for it. In case they are not able to pay for it but can make a good statement, we are ready to carry a small part of it on chance.—R. G. Howard—Bessemer Motor Truck Co.—Bessemer.

St. Louis, Mo.—There are many buyers who wish time payments. Your suggestion of a standard time-payment arrangement is a good one. The purchaser should bear interest charges.—C. S. Aull—Benoist & Aull.—Commer.

Cincinnati, O.—It is true that the question of part payment, in the form of easy payments, is occasionally brought up. However, inasmuch as our line of vehicles is sold at a very moderate price, we are not experiencing any difficulty whatever in having laundry men or merchants purchase our line. I understand, however, that truck dealers handling higher-priced goods are not only continually approached with this form of easy payment, but that quite a number of them in our city have adopted this method in order to dispose of their line.—M. A. Enders—Ford Motor Car Co.—Ford.

Cleveland, O.—We have the difficulty with the small merchant which you mention, but inasmuch as our smallest car lists at $2400 we are not under the difficulties that the dealers in cheaper cars suffer. We do not believe it would be possible for a standard time payment arrangement to be adopted, inasmuch as every request for time presents an individual problem. This matter, in our judgment, must be handled according to the merchant's judgment in each case.—W. C. Malin—Grabowsky Power Wagon Co.—Grabowsky.

Notes Not to Extend Over Four Months

Philadelphia, Pa.—Question of selling trucks to merchants and others on time is very troublesome. Quite a good many buyers cannot afford to take $3000 or $4000 out of their business to pay for a truck, although their credit is good and their financial standing excellent. We think that at least one-half should be obtained and the balance on short terms, notes not extending over four months.

There has been great injury done to the truck business, by concerns having large capital, selling to merchants and others at the most ridiculous prices and on the most ridiculous terms. The writer knows of one case where the price was cut 30 per cent. and of another where the term would extend over 3 years; and several others where the term exceeded twelve months with but a small cash payment. This is obviously unfair, unbusiness-like and poor policy, and the Philadelphia Trade Association at the present time is going into this subject very thoroughly with the object of improving conditions all around.—F. S. Browning—Continental Motor Car Co.—Speedwell.

Chicago, Ill.—Will state that there are a great many people that desire easy payment on motor trucks but we are very much against this proposition, which could be overcome very readily should all the manufacturers and dealers refuse to allow anything of this kind. There is a great enough demand for trucks nowadays, so it should not be necessary for anybody to sell their merchandise on time.—R. S. Mattoon—R. S. Mattoon Motor Co., Indiana.

Easy Payment System Would Not Increase Sales

Cleveland, O.—It is very seldom that the question of time payment arises. We do not believe that any easy payment plan would increase the sale of our trucks to an amount which would offset for the trouble and risk involved extending payments over any considerable time. We are making our sales on the basis of a 10 per cent. deposit at the time the order is placed provided a body or other special features are required, the balance of the payment to be made upon delivery of trucks. In particular cases dealing with large and responsible companies, we are waiving the 10 per cent. deposit, but the terms remain net cash upon delivery.—E. J. Barttel—Baker Motor Vehicle Co.—Baker.

Pittsburgh, Pa.—In a number of cases we have been confronted with the problem of selling trucks on time, and where the standing of the firms in question was satisfactory to us and their general reputation good, we have found no difficulty in negotiating their paper. In several cases, however, we have been obliged to lose the sale of a truck rather than take a chance upon the credit of many small merchants. I believe it would be a very difficult matter to devise a form of standard time payment, which could be applied to all cases.—Julian B. Howe—Pittsburgh Automobile Co.—Commercial.

Chicago, Ill.—We find that it is necessary, not only in the small truck of 1,500-pound capacity, but also in the larger trucks, to sell on time payments. Believe the first reason for this is the fact that the price of horses is not the highest. It may please you to know that in one instance of a horse broker at the stock yards, a friend of the writer's, who has been shipping in the past three carloads of draft horses per week to New York, is now shipping but one carload a week; therefore, there must be a poor market, and if the teamsters or concerns who are using horse-drawn vehicles wish to add trucks they would like to have a little time in order to sell their horses and equipment to save a new investment. We believe that the slackness of business at the present time and the desire of the jobber or manufacturer to use a truck, necessitate him asking for a little time right now. As business increases we believe, however, that this condition will be gradually eliminated.—M. H. Luce—Velie Motor Vehicle Co.—Velie.

New York City.—We have not attempted for some time to sell to small merchants, retail grocers and laundries, because we are putting out nothing smaller than a 3-ton car. When we were offering 1-ton cars we found a great many people in the lines you mentioned anxious to buy motor vehicles if they could get them on part cash and part credit. In almost every case the credit desired exceeded 50 per cent. of the price of the vehicle and ran anywhere from that figure up to 90 per cent.

We think that a large number of vehicles could be sold on those terms, but for the present would not consider such a proposition as applying to any of our product.—J. H. Kennard—Couple-Gear Co. of N. Y.—Couple-Gear.

Selling Trucks for Cash Only

Minneapolis, Minn.—Yes, we are having a great deal of difficulty in selling trucks to the small merchants, retail grocers, laundries, etc., on account of their being unable to spare the money from their business and wanting to buy them on payments. Up to the present time we have not accepted any of that kind of business. We are selling our trucks for cash only.—A. E. Thompson—McArthur, Tollars & Thompson Co.—Federal and Kelly.

Chicago, Ill.—The question of time payments is one which must be faced in the commercial car business, not only with the small merchant, but with the larger ones as well. The small merchant whose business requires but one car is not likely to have a sufficient amount of money laying idle to pay in full for a car. In fact, if he is a thrifty merchant he surely will not have the money lying idle, but will have all of his capital invested, working for him and earning something. The same condition exists with the majority of the big institutions whose business will warrant the purchase of a considerable number of cars, except that, as a rule, the small merchant would prefer to give interest-bearing notes to cover the deferred payments on his car, while the larger institution can, as a rule, borrow the money at a considerable saving in interest and pay cash for its cars. Our policy is to treat this matter in the same manner as would the ordinary jobbing house and extend such credit to purchasers as each individual case will warrant. In our opinion, standardization of a time-payment plan is as impracticable as would be the standardization of the credit system of the wholesale grocers and clothiers of the country.—W. A. Zimmerman—Mercury Mfg. Co.—Mercury.

Philadelphia, Pa.—Our policy is cash sales in selling cars.—P. Prouty—Autocar Service Co.—Autocar.

CHICAGO, ILL.—We have not taken up with the small merchants the sale of trucks as yet.—F. L. Thomas—Franklin Automobile Co.—Franklin.

CHICAGO, ILL.—Not only small merchants, but many of the larger ones ask for time on trucks, but as we have no wagon which fits this smaller need we have no solution on the handling of this situation.—L. B. Garrison—Speedwell Motor Car Co.—Speedwell.

Cash Payment and Interest-Bearing Notes

SAN FRANCISCO, CAL.—Practically all of our sales are made for cash, but occasionally we find a case in which it is desirable to make an exception. In these cases we endeavor to secure a cash payment equal to the cost of the truck and interest-bearing notes secured by lease contract for the remainder. We prefer to make all of our sales for cash and are not prepared to say that it would be wise to establish a standard time payment.—H. O. Marsh—Standard Motor Car Co.—Federal and Kelly.

SAN FRANCISCO, CAL.—The small merchants would like to buy trucks, but they have not the ready cash; they would like to buy on easy terms. If we do give any credit of this kind we take down all we can get and then take the party's note on 6 per cent. or 7 per cent. We make out a lease, that the truck belongs to us until it is paid for. All notes are made in monthly payments, and we shorten the time on payments as much as we can. We would not have any notes running over one year on last payment.—Paul J. Kleiber—Kleiber & Co.—Commer.

NEW YORK CITY.—Not a great deal of difficulty with smaller merchants, although we occasionally meet with the situation. We do not feel at liberty at this time to make a positive statement with reference to the second part of your question.—L. A. Van Patten—American Locomotive Co.—Alco.

CHICAGO, ILL.—We have a plan covering the sale of commercial cars on time payments which is as follows:

One-half of the purchase price of the car in cash, the balance in three equal payments of 30, 60 and 90-day notes bearing 6 per cent. interest and the deferred payments secured by mortgage on the car.

We lose many sales, however, for the reason that our time arrangement is not more liberal, but we hardly believe a smaller cash payment and a long-time extension is consistent with good business. Our credit department passes on all sales where time is required.—E. W. Arbogast—Studebaker Corp.—Studebaker.

Small Merchant Appreciates Durability Above Price

MINNEAPOLIS, MINN.—We find that small merchants, grocers, laundries, etc., drift naturally to the cheaper truck on account of the price and do not tie up so large an amount of money in a truck. Yet we have found that those same men after they have used the cheap proposition for 3 to 6 months are the right kind of people to sell a good truck to, for they then appreciate durability above price. The writer doesn't believe that the time has arrived when trucks should be sold upon a small amount of cash down and deferred payments for the balance; or not until the owners of trucks and drivers give them the care that a railroad demands from a locomotive engineer. The engineer is only allowed to run so fast, and should he exceed the limit he is called upon the carpet. At the end of the journey his engine is turned over to a proper mechanic, is given a rest and cleaning up and thoroughly overlooked. With the commercial truck after the day's work is done the majority of them are run under a shed without any care until another day. Therefore the truck is subject to greater abuse than any other piece of machinery manufactured and it is expected to stand up under all these things. When trucks are given greater care and more efficient operators are provided, then and then only will they become an article of merchandise on deferred payments.—G. M. Oston—Avery Co.—Avery.

CHICAGO, ILL.—We are not building at the present time a smaller truck than 2-ton capacity, therefore do not come in contact with the small retail grocers.—F. E. Parker—Packard Motor Car Co.—Packard.

ST. LOUIS, MO.—The problem of selling electric trucks to small merchants of limited capital is an aggravating one. In this city there are a large number of cheap gasoline cars being sold to do work that beyond the question of a doubt should be done by electrics. The chief reason for this is, of course, the price. We have never approached this problem on a time-payment basis, but even with such a proposition to offer we do not believe that much headway would be made until such time as the limitations of the cheap gas car become general knowledge.—C. S. Michel—Union Elec. Lt. & Power Co.—General Vehicle.

PHILADELPHIA, PA.—There are a lot of small merchants who desire to buy trucks and we have found it to our advantage to help them to purchase the same by taking their notes in part payment up to six months. I believe a great many trucks could be sold if a standard time payment were established, but we do not feel justified in doing this at the present time. One of the truck companies doing business in Philadelphia has made arrangements to sell trucks at $100 down and $100 per month. They have placed quite a few of them, showing that a number of trucks could be sold on the time proposition.—W. H. Metcalf—Woods Electric Garage—Mais, Walker, Waverley, Detroit and Dayton.

One-Half Cash, Balance in Installments.

ELMIRA, N. Y.—Would say we believe selling trucks on installment plan would induce many sales, but we think the plan you have figured out would involve a tremendous investment for the larger manufacturers. To carry all our vehicles in service would be almost prohibitive, with us at least.

Now if a plan could be worked out whereby the purchaser would be willing to pay one-half cash and the balance in monthly installments we would be willing to listen to it. We do not think, however, we would go into the proposition as outlined with only a cash payment of a couple of hundred dollars.—C. B. Hatfield—Hatfield Auto Truck Co.—Hatfield.

CINCINNATI, O.—It is not only the small merchants, but contractors and other people of that class that could really use motor trucks if they could get terms of easy payment. We have ourselves financed some time deals where the party was perfectly good and it only took our own indorsement of the note to cash the note at the bank at par, the buyer paying the interest, but we are naturally very careful as to whom we sell trucks on such terms. Again, there are a lot of truck agents who could not make the proper agreement with a bank to finance on those terms. We believe that many sales could be made if the truck purchaser could get 6 months' time and have the paper financed from the factory rather than from the agent, as is generally the rule with the sale of many kinds of machinery, and is almost universally the case with the sale of traction engines and farm machinery.

The truck factories that will be the leaders in such a movement will get a lot of business, but they will need a highly developed credit department to carry it on successfully.—T. A. DuBrul—Miller, DuBrul & Peters Mfg. Co.—Avery.

CHICAGO, ILL.—We are not experiencing much difficulty with small merchants who are desirous of purchasing commercial automobiles on the deferred payment plan and have in several instances entertained orders on the basis of $500 cash and the balance in 1, 2, 3 and 4 months.—W. W. Bishop—Chicago Pneumatic Tool Co.—Little Giant.

PHILADELPHIA, PA.—Very few concerns have money to buy trucks right off. A standard time payment would be well.—N. W. Buzby—Merchants' Motor Service Corp.—Dayton.

Fremont, O.—Would say we are selling a few trucks on the installment plan. They are, however, almost entirely the 1-ton size, and to concerns who, as stated in your letter, have not the ready cash to lay out immediately. We are taking anything from $200 to $500 down and the balance in 12 equal monthly payments with interest at 6 per cent. We require a chattel mortgage, or a lease, or any other good security is preferred, and our local banks for the most part take most of this paper, as we allow them to pass upon it before we accept it, and if they accept it we naturally find it just as good as the cash.—H. S. Diller—Lauth-Juergens Motor Car Co.—Lauth-Juergens.

New York City.—Where small merchants, such as retail grocers, laundries, etc., desire to buy a motor truck on time payments, we can take their order and then have the financial end of the contract filled by one of three finance companies in New York City, who require a buyer to pay about 40 per cent. down, the balance of 60 per cent. extending for eight or ten monthly payments. The finance company, therefore, pay us the full amount when the car is delivered and the buyer gives notes to the finance company for the amount he has to pay them.—R. T. Alcutt—Knox Automobile Co.—Knox.

No Difficulty With Small Merchants

Philadelphia, Pa.—We are having practically no difficulty with small merchants who desire some form of easy payment, for the reason that we insist on prompt payment and do not care to do business in any other way; and we believe that if other manufacturers would take the same position that the small merchant with whom it is at all desirable to do business will find the money to pay promptly. We believe it is seldom, where a man is sincere and the kind of customer you wish to do business with, that he cannot afford to pay promptly; and if he desires any other terms it is simply because he knows they will be offered him by some manufacturers and naturally uses this as a club in purchasing to obtain the best possible terms.—E. S. Hare—Commercial Truck Co.—Commercial.

Minneapolis, Minn.—We are having a good deal of trouble with the smaller class of buyers at present. We make arrangements with the good ones for time payments and believe that the adoption of a standard time payment arrangement would be of great benefit in making sales.—A. C. Showers—Chase Motor Truck Sales Co.—Chase.

Chicago, Ill.—Our trucks are of large capacities and we do not find many people who want to buy them on time.—J. P. Foraker—Foraker-Dayton Motor Truck Co.—Dayton.

Cincinnati, O.—We find most small merchants are utterly unable to pay cash for their delivery cars, although such cars if placed in their business would be a boon thereto. In some instances with merchants whom we know are good we do not object to extending terms, although we have endeavored to refrain from so doing as much as possible.—H. V. Ilg—Schact Motor Car Co.—Schact.

Many Would Buy on the Installment Plan

Chicago, Ill.—We have a great many people who would like to purchase trucks on the monthly payment plan, but so far we have not catered to this class of business, although we anticipate that at any time some such arrangement may possibly be necessary.—F. N. Stewart—Buick Motor Co.—Buick.

New York City.—Would say we are constantly up against the time proposition, but have as yet been able to sell our entire output for cash. We think, however, that if there were some means of financing the time proposition that business could be very much increased, owing to the fact that there are hundreds of merchants who have their cash tied up in horse-drawn equipment who would gladly buy a motor truck if they could convert them into cash.—F. F. Lewis—Knickerbocker Motor Truck Co.—Knickerbocker.

New York City.—There have been a great many sales lost by concerns who would not accept time payments or notes, even though the parties wishing to purchase were reliable.

I understand that in the case of smaller cars up to 2-ton capacity it is almost absolutely necessary to make some allowance with regard to payment either by taking notes or selling on installment plan. I believe that many sales could be made if some standard time payment arrangement were adopted.—P. W. Gaylor—J. Jaccard & Co.—Aries.

Minneapolis, Minn.—Owing to the fact that we do not build anything smaller than a 1-ton we do not come in contact with the smaller class of trade to a great extent. The only people in this line who can use our goods are the large concerns, who are able to pay spot cash.—G. D. Wilcox—Wilcox Motor Car Co.—Wilcox.

Minneapolis, Minn.—There are a number of concerns who would buy motor trucks if they could be bought on time. Sometimes arrangements are made with the banker or capitalist to carry the account.—P. J. Downes Co.—Gramm.

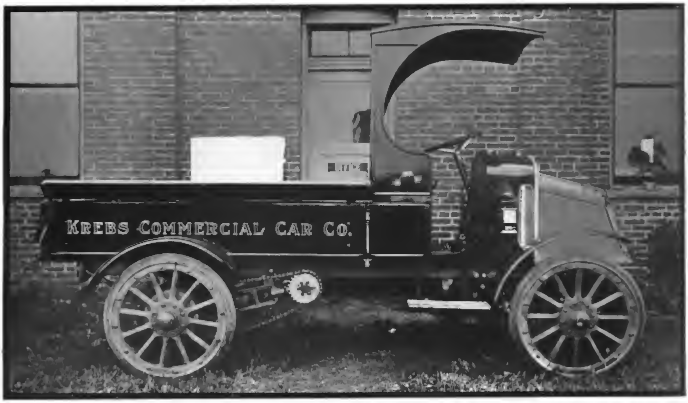
Philadelphia, Pa.—We have come in contact with several small merchants who would no doubt have bought our trucks on an easy-payment plan, but in our estimation the industry is not far enough advanced for this at the present time. It could possibly be worked to advantage by an old-established firm operating on a large scale with an extensive service department.—E. C. Johnson—E. C. Johnson Co.—Reo.

Medford, Mass.—Have lost many sales because we would not give as long credit as some others in our line; better all round if the length of credit was limited, and the shorter the better.—P. J. T. Teel Mfg. Co.—Teel-Woodworth.

Banks Are Liberal in Truck Purchase Money

Auburn, Ind.—We are interested very much in the installment-payment for light delivery wagons to small merchant and grocers. I don't see how a small institution is going to compete in this line of work with the large factory that has abundance of capital and abundance of facilities of placing just such paper as they have and would receive on such sales. I believe that banks are getting to be more liberal on the question of advances on motor trucks, but would not be able up to the present time to know where any such volume of paper should be placed, for we, with probably many others, are not in position to carry such paper. I believe your suggestion is a good one and would like to act favorably on it, but back of it is a banking proposition that until this could be financed would be a barrier that would prevent pretty general adoption of it.—W. H. McIntyre—W. H. McIntyre Co.

Long Island City, N. Y.—Our opinion of the installment payment plan as outlined in your July issue is: We have not yet had occasion to sell vehicles through such channels, the proposition does not particularly appeal to us. We appreciate that thousands of light commercial vehicles will doubtless be marketed in this way, but it has been our experience that the man whose business requires only one light delivery wagon usually prefers the semi-convertible machine; in other words, one that he can use on Sunday for pleasure if so disposed. This would mean the construction of special vehicles and we prefer to stick to standard designs. We quite frequently sell one 1,000-pound wagon to a customer, but said customer is usually in a position to take on one or two more when the initial wagon has proved satisfactory. The man who has two single-horse delivery wagons usually leans toward the light inexpensive gasoline wagon, and it is probably the best thing for him, especially in small towns. The question of installment plan payments has so far seldom been presented for our consideration, perhaps because we invariably waive the matter of increased distribution at the possible cost of a dissatisfied customer. The question of adaptability comes first with us in all our sales.—General Vehicle Co.—General Vehicle.



Model of Vehicle Made by the New Truck Makers, the Krebs Commercial Car Co.

Krebs Motor Truck

Two Models of Two-Cylinder Two-Cycle Cars of 1500 Pound Capacity Shaft and Chain Driven

ONE of the latest motor truck companies to enter the field is the Krebs Commercial Motor Car Co., of Clyde, O., with which company are associated the names of Louis Krebs, Frank Baehle, B. A. Becker and J. H. Becker, all of whom have been connected with the motor industry since the opening of the century, these gentlemen having been the guiding factors of the Elmore Company, Clyde, O., until its sale to the General Motors. It is but natural that these men on entering the truck field should pin their faith to the two-cycle type of motor which has been an Elmore characteristic since its début, which policy they have announced in their new commercial car venture. They are building two models of two-cylinder, two-cycle cars of 1500-pound capacity, one model being shaft driven with bevel-gear reduction at the axle and the other, side chain-driven. The chain-driven model is fitted with solid rubber tires and has a rated speed of 15 miles per hour, whereas the shaft-driven type is shod with pneumatic tires and has an accredited speed of 20 miles per hour.

In the two models which have been given the trade names of A and B, the former the chain-driven, solid-rubber tire vehicle, the body design and chassis arrangement is the same, the vertical motor being carried under a Renault style of hood with the radiator incorporated in the dash, but with the steering wheel on the left side and gearset and brake levers in the center for right-hand operation.

The length of the loading platform in the different body types is 83 in. and the width is 45 in. Back of the rear axle there is an overhang of 35 in. From the front of the loading platform to the front of the truck there is a distance of 81 in. and a distance of 86 in. from the rear end of the truck to the driver's seat, thus placing the seat in almost the exact center of the vehicle. The loading platform has a height of 32 in. above the ground when the truck is not loaded which is decreased to 29 3-4 in. when the vehicle carries a load.

Over-All Measurements and Weight

The total overall length is 167 in. on a 100-in. wheelbase. The diameter of the turning circle is 38 feet.

The total weight of the truck having a delivery body is 2600 pounds and 2400 pounds when fitted with an express body. The weight of the truck over the front wheels when loaded is 1550 pounds and over the rear wheels 2350 pounds, thus causing 10 per cent. of the load to be carried over the front wheels and 90 per cent. over the rear wheels.

Model A has a speed of 15 miles an hour on high gear, 10 miles an hour on intermediate, 4.5 miles an hour on low and 3.5 miles an hour on reverse. Model B, of course, being equipped with pneumatic tires, has a greater speed than the first. On high speed it will travel at the rate of 20 miles an hour, 13.3 on second speed and 6 miles an hour on low, while its reverse speed is 4.6 miles an hour.

The motor, as has been mentioned above, is of the two-cylinder, two-cycle type and has no valves. It has a 4 1-2 inch bore and a 5 inch stroke. The motor is controlled directly by a governor whose speed is set at the time the car leaves the factory. The governor acts on the fuel supply, giving the motor automatically the amount of fuel required. The advantages claimed for this governor are that all possibility of fuel being wasted is eliminated, and that when the motor is stopped the governor throws a fresh charge into the motor. The governor is controlled by a lever on the steering wheel which also controls the magneto, thus automatically adjusting the time of the ignition to the speed of the motor. The ignition is by means of a Bosch high-tension magneto. The thermo-syphon system of water circulation is used in the cooling system, the radiator being of the vertical tube type. A Stromberg carburetor is used.

The cone clutch is self-contained on the crankshaft.

The Brown-Lipe selective transmission is used, there being three speeds forward and one reverse.

The front axles in both models are drop forged, I beam in type and are 1 3-4 by 2 5-8 in. in size. The rear axle in the chain-driven model is rectangular in shape and its dimensions are 1 3-4 by 2 1-4 inches. In the shaft-driven model the rear axle is full floating and fitted with New Departure bearings. The driving shaft has two universal points.

Brakes, Tire Equipment, Springs, Etc.

The brakes are of the double internal, expanding type in both models and are on the rear axles.

The wheels are 34 in. The tire equipment consisting of 34 by 3 in. solid rubber tires with S.A.E. bands on Model A, and 34 by 4 in. pneumatic tires on the Model B.

The steering gears are the Jaycox worm and nut set.

The front springs are semi-elliptic, 2 in. wide and 40 in. long. The rear springs are 2 in. wide and 50 in. long.

The frame is made of pressed steel with a channel 4 by 2 by 3-16 in.

The chassis price of either model is $1,375 at the factory.

Lauth-Juergens 5-ton

Motor-Under-the-Seat Type—Four-Cylinder and Four-Cycle Motor—Enclosed Driver's Cab

THE Lauth-Juergens Motor Car Company, Fremont, O., has recently brought out its first 5-ton commercial vehicle. The new truck, which is known as Model J, is the same in general design as the other models turned out by this company and is of the motor-under-the-seat type with an enclosed driver's cab. The steering column and the gear shifting levers are on the right hand side.

The wheel base is 140 inches unless otherwise ordered.

The total length of the loading platform, measured from the back of the driver's seat, is 15 ft. and its width is 6 ft. The loading platform overhangs the rear of the frame 1 ft.

Over-All Measurements and Tread

The truck has a total over-all length of 20 ft. 2 in., including the body, and the total over-all length of the chassis is 18 ft. 8 in. The length of the frame, measured from the back of the driver's seat, is 14 ft. The frame is 36 in. wide.

The tread measures 65 3-4 in.

The truck can be easily turned in a street 70 ft. wide.

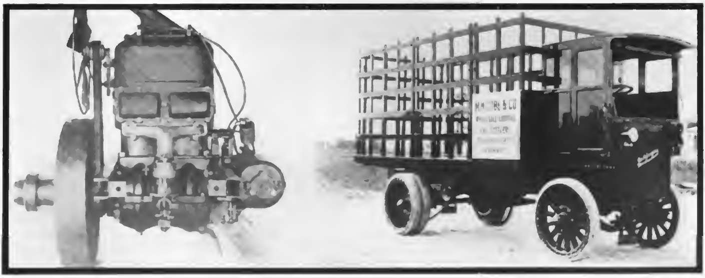
The weight of the truck without a load is 7400 pounds.

The vehicle has a speed of 9 miles an hour.

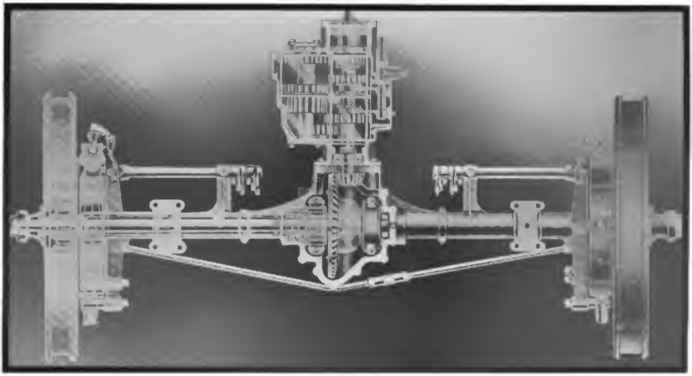
The cab which surrounds the driver's seat can be tipped forward over the radiator, which forms the dash, rendering the motor easily accessible.

The motor is of the T head, 4 cylinder, 4 cycle type, having a 4 3-4-inch bore and a 5 1-2-inch stroke. Its weight is 580 pounds. The crank shaft is 2 in. in diameter on all bearings. The front and center crank shaft bearings are 3 1-2 in. long and the rear crank shaft bearing is 4 in. long. The connecting rod bearings are all 3 1-2 in. in length, and the connecting rods themselves are 12 in. long. The pistons are 6 in. long and are fitted with four piston rings. The motor is water cooled, the water being circulated by means of a pump which is driven direct from the front of the camshaft. A Rayfield Carbureter is specified. There is a dual system of ignition which consists of a Mea high tension magneto and a storage battery with a separate timer.

A force feed system of lubrication is used, the oil being circulated by means of a pump, which is located on the out-



Intake Side of Krebs Motor; and the First Lauth-Juergens 5-Ton Model Sold



Three-Quarter Floating Axle which is the Special Feature of the New Willys-Overland 1913 Model.

side of the lower crankcase and driven by spiral gears from the camshaft. The lubricant flows through a main duct, cast integral with the crankcase and distributed to the main bearings by means of ducts drilled in the webs. From these bearings it is forced through a hollow crankshaft to the connecting rod bearings. The oil is filtered before it reaches the different parts of the engine.

The clutch is a three-piece disc clutch consisting of two metal discs between which there is a fiber disc with a large friction surface. It is operated on roller bearings with a ball bearing thrust.

Between the clutch and the transmission there is placed a universal joint.

The transmission is of the selective type, there being four speeds forward and reverse. The three-point suspension is used and the gear box is housed as a unit with the jack shaft. It is fitted throughout with imported ball bearings. The transmission shafts are 2 3-16 in. in diameter and the gears have a 1 3-4 in. face. The differential is large in size and is made of chrome vanadium. Final transmission is by means of chains to the rear wheels.

Semi-Elliptic Springs and Solid Rubber Tires

Semi-elliptic springs made of silica-manganese steel are used all round. The front springs are 44 in. by 3 in. and the rear are 54 in. by 3 1-2 in., supported by four coil springs designed to carry the load weight above 4 tons.

The axles are I beam front with 5-inch drop and rectangular rear with 2 3-4 by 4 in. The hubs are fitted with roller bearings.

The emergency brakes are of the contracting type, acting on drums on the jack shaft. The service brakes are of the expanding type and act on drums on the rear wheels. These drums are 20 in. in diameter and have a 4-in. face.

The wheels are 40 in., carrying 40 by 6 single solid rubber tires in front and 40 by 6 dual solid tires in the rear.

The Ross steering gear fitted with a 22-in. hand wheel is used.

The frame consists of 7-in. rollled channel steel with an angle steel subframe. The width of the frame is 36 in.

The chassis price of the vehicle is $4,500 at the factory.

New Willys-Overland

Incorporation of a Three-Quarter Floating Rear Axle of Special Design, Involving Important Changes

THE most important change announced by the Willys-Overland Co., Toledo, O., for its 1913 Overland delivery vehicles is the incorporation of a three-quarter floating rear axle of an especial design. Formerly the Overland trucks were equipped with a semi-floating rear axle.

A number of important advantages are claimed for this new axle, the most important being in the distribution of the load and body weight, which is carried on the axle housing, the latter being reinforced by an inner steel tube riveted and keyed to the housing proper. The use of heavy felt washers which are pressed against the axle tube by a spiral spring precludes all possibility of lubricant from the differential creeping through the axle housing, past the axle shafts and thus into the brakes. Another advantage claimed for the new axle is in the accessibility of its units, provision being made for the easy adjustment of all bearings and bevel gear.

The transmission and the differential mechanism are combined into one unit by placing the gearbox on the rear axle. The adoption of this form of housing the differential with the rear axle, results, it is claimed, in a more rigid construction and the saving of a large per cent. of the power of the motor. The shafts in this transmission are short and all gear changes are made with short and quick movements of the gear-shifting lever placed in the center of the vehicle.

Main Driving Shaft and Brakes

The main driving shaft is enclosed in a steel torsion tube which serves the double purpose of taking up the twisting stresses of the rear axle and keeping the driving mechanism in alignment with the drive shaft.

The brakes mounted on the rear axle are of new design also and are extra large in size. The diameter of the drums is 13 3-8 in., their width is 2 7-8, and the width of the brake band is 2 1-4 in. The service brake is adjustable in two ways, one for coarse adjustment at the adjustment sector and the other shortening the service brake band levers for finer adjustment.

The differential bearings and the rear wheel bearings do not come into contact with the axle drive shafts, as the roller bearings of the rear wheels run on the hardened seamless steel tube which projects from the axle housing each side.

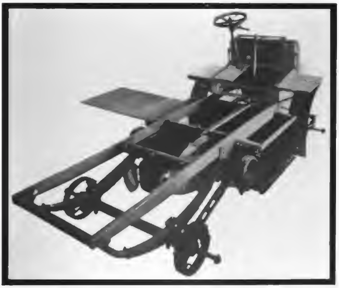
The only duty the axle drive shafts have to perform is to turn the wheels, the differential bearings being relieved of all but their own stresses in this way.

The Hyatt roller bearings of the rear wheels are in the vertical plane of the spokes and as they carry the rear load they receive it straight from above and need no adjustment. An adjustable ball thrust bearing on either side of the differential takes up all side thrust.

Difference Between New and Old Axles

The only difference between this new axle and the full floating rear axle in other Overland models lies in the way in which the wheels are carried, being fastened to the axle shaft in the new axle. But in the way they carry the load and in the independence and the safety of the bearings, the three-quarter floating and the full floating types are alike.

Upon close examination of the illustration on the preceding page, the various features of the new axle will be readily understood.



Chassis of Urban Electric Commercial Vehicle, Showing the Battery Box Open at Sides and Top

Four Urban Electrics

A 1000-lb., a 2000-lb. for Heavy Delivery and Light Trucking, a 2-ton and a 3 1-2-ton Vehicle

THE Kentucky Wagon Manufacturing Co., Louisville, Kentucky, builders of the Urban electric commercial vehicles, is at present making them in four load-carrying capacities, namely, a 1,000-pound delivery, a 2,000-pound truck designed for heavy delivery work and light trucking, a 2-ton and a 3½-ton vehicle. These different models, which are known as Models 10, 20, 40 and 70 respectively, differ in design only in the construction of the various parts in accordance with the load capacity and the power required, the company following its policy of adopting only those features of construction that have proven satisfactory in long operation.

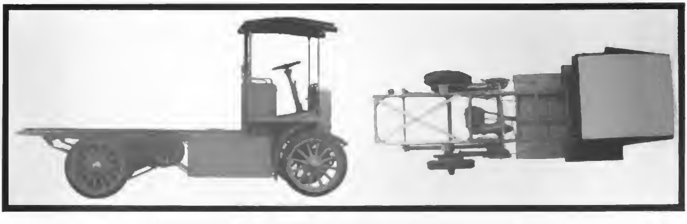
The steering post, which is inclined 30 degrees from the vertical, is on the left side of the vehicle and the emergency brake lever is in the center. The steering mechanism is of the worm and nut type. The service brakes are operated by means of a pedal.

The control of these vehicles has been carefully worked out with a view to providing for the convenience of the operator and the safety of the machine and its load. The speed of the car is controlled by means of a lever mounted just beneath the steering wheel, this lever operating in the lower slot of a gate for the four forward speeds and in the upper slot for the two reverse speeds, it being necessary to operate a thumb latch before the lever can be moved in either direction through the gate.

Accessibility of Parts

The controller, lighting and emergency switches, ampère-hour meter, wiring terminals, etc., are mounted in the short shroud which forms part of the chassis. These parts, except the switches, are readily accessible upon the removal of an aluminum panel, which closes the rear of the shroud. The switches are mounted in the wood frame which surrounds the removal panel and may be easily reached from the driver's seat. The emergency switch is fitted with a key, which can be removed when the switch is in the off position.

The battery is suspended under the frame just forward of the countershaft, as will be seen by referring to the illustration. It can be reached from either side or from the top, the trays being proportioned and arranged so as to permit of easy withdrawal from either side of the vehicle. Particular care has been taken to prevent the entrance of foreign matter. Batteries can be supplied in either lead or



Side View and Plan of Urban Electric, Showing General Design of the Vehicle nickel-iron types, the former being offered in standard, medium, thin plate or ironclad types.

The motors, of General Electric design and manufacture, are designed along such lines as have been found most satisfactory in street car service, but with due regard for high efficiency in storage battery service. Motor capacities range from that of the 60-volt, 28-ampere motor of the Model 10 to that of the 85-volt, 40-ampere type of the Model 70 and are all capable of carrying a large overload.

An inverted tooth chain enclosed in an oil tight aluminum housing and running in oil transmits the power from the motor to the countershaft. The large sprocket of this combination is mounted on the flange of the differential. The differential gears are enclosed in cast steel housings, and their internal parts, which are heat treated and have all bearing parts ground and provided with liberal oil passages, are of 3.5 per cent. nickel steel. Nickel steel shafts convey the power from the differential to the final driving chains, which act on sprockets mounted on the brake drum, which are in turn attached to the spokes of the rear wheels. Means are provided for readily adjusting all chains. The countershafts are mounted on large annular ball bearings and as there is an absence of end thrusts a simple assembly of four bearings results.

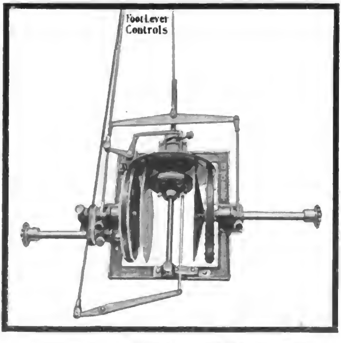
Construction of Springs, Brakes and Frame

The springs are fastened to the axles by special nickel steel bolts of large diameter, which pass through rigid cast-steel plates mounted on top of the springs. The bolts are made of heat-treated nickel steel.

The service brakes are of the contracting type, acting upon the countershaft, and the emergency brakes are of the expanding type acting upon the rear wheels.

The frames are of pressed steel, varying in maximum depth from 3 to 7 inches. In conjunction with the sub-frame which forms the battery compartment an ingenious system of trussing has been applied, which insures against undue deflection of the frame under overload conditions and permits the use of light sections in the main frame. Each frame has five cross members, three of these being attached to the side members by integral gusset plates. Two of the cross members are of lighter section, without gussets, and serve for the suspension of the sub-frame.

Rear wheels are equipped with dual tires.



Double Friction Transmission of New Dispatch Vehicle

New Dispatch Truck

A 1000-lb. Capacity Vehicle With Pneumatic Tires for Retail Merchants and Specialty Shops

MANY unique features are to be found in the Dispatch commercial vehicle manufactured by the Dispatch Motor Car Co., Minneapolis, Minn. The truck turned out by this company is of the 1000-pound capacity class, having a 120-inch wheel base, a standard 56-inch tread and a clearance of 14 inches. The vehicle is designed with a view to supplying the retail merchants and all specialty shops. A variety of types of open and closed bodies from which the purchaser can select that best suited to his particular line of business can be supplied.

The new vehicle has pneumatic tire equipment, its tires being 36 by 3½ inches in both front and rear. The rims are quick detachable.

The control of the speed of the truck is by means of pedals entirely, as the friction drive type of transmission used does not require a clutch, gear set or differential. The use of this form of transmission lessens the weight of the truck by 4/5ths, and, it is claimed, brings about a reduction of $500 in the cost of production and consequently a reduction in the selling price of the vehicle. The design of this transmission is entirely new to the commercial vehicle field and in fact to the whole automobile industry, inasmuch as there are two friction discs instead of one. There are six distinct advantages claimed for this type of transmission; first, that the double surface contact principle gives not only double pulling power, but also equal thrust to each side of the driving disc with perfect alignment of parts at all times and a loss of only 3 per cent. in power; second, the elimination of weight mentioned above; third, this elimination of weight makes possible the use of full elliptic springs in front and rear and increased tire mileage; fourth, the foot control leaves the driver's hands free to steer the truck; fifth, the transmission is easily accessible; and sixth, the wearing surfaces of the transmission are easily renewable. One of the two friction discs mentioned above is fastened to each driving shaft and they are actuated by a third disc fastened to the end of the main shaft from the motor. This new type of transmission will be readily understood upon glancing at the accompanying illustration. There are only three parts that require any oil, these being the roller bearings. Encased chains, running in oil, serve to transmit the driving power to the rear wheels.

Distinctive Features of the Motor

The distinctive features of the motor, which is placed forward under a hood somewhat similar to the Renault type, are that its four cylinders are cast separately, and it is fitted with twin Schebler carbureters to insure an even supply of fuel to the motor. The motor is a Silent Dispatch of the air-cooled type and has a gravity gasoline feed. The jump spark form of ignition is used, a high tension distributor being employed. A starter press button is located on the dash and also a convenient kick-switch. The motor is controlled by a spark and a throttle lever placed on the top of the steering wheel, which is 18 inches in diameter. The steering post is 2 inches in diameter.

There are two sets of brakes of the internal expansion type, being placed on the rear hub drums and on the transmission. Both brakes are operated by pedals. The front and rear springs are full elliptic and the rear springs are fitted with a rear-end suspension scroll.

A 500-Pound Chase

A Low-Priced Light Delivery Vehicle With Two-Cylinder Motor of General Chase Design

THE latest addition to the line of commercial vehicles manufactured by the Chase Motor Truck Co., Syracuse, New York, is that of a 500-pound capacity delivery truck, brought out to meet the demand for a low-priced light delivery vehicle. The general design is similar to the design of other models made by the Chase Co., which builds vehicles with both right and left control and two- and three-cylinder engines. The new model has a two-cylinder engine of the conventional Chase type, and the left side control and steer. The speed of the truck is 12 miles an hour on high and 4 miles an hour on low gear. The price of the vehicle equipped with an express body is $500 and $600 when fitted with a panel top.

The loading platform is 58.5 inches in length and 40 inches in width and overhangs the rear axle by 20.5 inches. When the truck is loaded the height of the loading platform above the ground is 31 inches and this distance is 33 inches when the truck is empty.

The truck can be turned in a circle having a diameter of 30 ft.

The total over-all length of the vehicle is 10 ft. 6 in. on an 84-in. wheel base. The distance from the dash to the front of the seat is 22 in. and the distance from the front of the seat to the back of the body is 8 in.

The weight of the vehicle is 1500 pounds.

Particulars of Motor and Transmission

The motor, which is of the two-cycle, air-cooled type, has two cylinders of 4⅛-inch bore and 4-inch stroke, giving 12 horsepower. It is placed in front of the dash, under a hood. Ignition is by means of a high tension magneto with a fixed spark. No oiler is used, the oil being placed in the gasoline tank.

The planetary type of transmission is used, there being two speeds forward and one reverse. The control is by means of a throttle lever mounted on the steering column, three pedals and a hand lever. The right pedal controls the service brake, the center the reverse, and the left the low speed. The high speed is controlled by the hand lever. A double side chain drive transmits the power to the rear wheels.

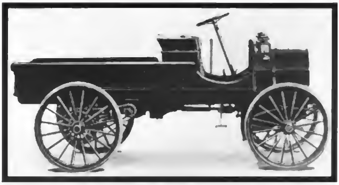
Duplex brakes acting directly on the rear wheels are used. The wheels are of wood, the front being 34 in. in size and the rear 36 in.

Solid rubber tires of the 2-in. size are used on both front and rear.

Both axles are square in shape, the front being 1¼ in. and the rear 1⅜ in.

In the front the springs are full elliptic 1½ in. and in the rear a cross spring is used, being 1¾ in.

The manufacturers of this little vehicle, which has been given the trade name of Model M, expect great things of it, and there is no doubt that there is a great demand for a truck of this capacity and price at the present time. The great number of smaller merchants, such as retail grocers, laundries, florists and others in whose business the loads are too small to warrant the purchase of a larger vehicle, but who have been anxious for some time to substitute motor equipment for their horse-drawn apparatus, will doubtless take a considerable amount of interest in this new light delivery vehicle.



Model M, Chase Commercial Vehicle

Best Motor Vehicle

Having a Capacity of 1000 Pounds and Equipped With Two-Cylinder Four-Cycle Motor

THE Flint Motor Wagon Department of the Durant-Dort Carriage Co., Flint, Mich., is preparing to put on the market in the near future a new Best commercial vehicle having a capacity of 1,000 pounds and equipped with a two-cylinder, four-cycle opposed motor of 14 horsepower and friction type of transmission. Other noteworthy features of the truck are the left-hand steer and the speed-control lever which is mounted on the steering column. The motor is placed under the floor boards and the radiator is at the front of the vehicle forming the dash.

The standard body equipment consists of two styles, a panel and an express body, but any style of body desired can be supplied on the standard chassis. The vehicle will make any speed up to 18 miles an hour forward and not over 5 miles an hour on reverse, and has solid rubber tires.

The motor is suspended on two steel tubes extending forward from the transmission support and supported in front by a cross spring, thus making one unit of the motor and transmission, supported in front by the cross spring and at the rear on either side by a ball and socket bearing.

Mechanical Features of the Motor

The cylinders, which are of the L head type, are cast singly. The ignition is of the dual system of jump spark, there being a magneto and a dry battery equipment. The spark is automatically controlled by the governor. The lubrication is by means of a plunger pump circulation. There are oil feeds to the main bearing, connecting rods and the cylinders. There is a sight feed arrangement on the dash. The thermo-syphon method of circulation is used in the cooling system. The radiator is of the vertical flat tube type with quick detachable motor connections. The radiator is suspended on springs which protect it from road shocks and frame distortion. The governor, which is enclosed in the crank case, is of the centrifugal throttling type. It operates on the crank shaft and is arranged to effectually prevent the racing of the motor.

The Kingston carburetor is used in connection with the gravity fuel feed.

The friction transmission is mounted on a V-shape casting, which takes up all stresses of the transmission and insures perfect alignment of the bearings.

Final drive is through a jack shaft to sprockets which transmit the power to double-side chains, which in turn transmit it to the rear wheels.

The Service Recorder

A New Device for Recording the Hours and Minutes During Which a Truck is Stationary.

A RECORDING device for commercial vehicles which records on a dial the hours and minutes each day and night that the truck is stationary or moving is being marketed by the Service Recorder Co., Cleveland, Ohio, the device being named the Service Recorder. The device is attached enclosed in cylindrical metal case and is bolted to the car dash, or other convenient and protected place, and is sealed, so that tampering by the driver is impossible without detection. The device is not driven by a flexible shaft from the wheel as is a speedometer, but is an entirely enclosed unit. It operates by a pendulum principle, the vibration of the vehicle when in motion causing the oscillations which are traced by a pointer or stylus on the chart record in the form of a zigzag line, whereas with the truck idle the pointer traces a straight line. The chart on which the pointer operates is a circular one, similar to a watch dial, divided off for a 24-hour period, so that it records the exact daily history of the truck for the 24 hours and is revolved by clock mechanism. A new chart can be used each day.

The Two Main Mechanical Features

The recorder has two main mechanical features, the timing and the recording mechanisms. The timing mechanism is a specially designed Seth Thomas seven-jewel 8-day movement, built and calibrated to withstand vibration, and is securely protected in a sealed housing. It revolves a brass disk once every 24 hours past a jewel-pointed stylus which registers travel and stop periods on a printed chart which lies flat on the disk and revolves with it. The stylus, being attached to one end of a free swinging pendulum, marks a thin clear line on the chart as long as the vehicle is quiet and the pendulm at rest, but when the vehicle is in motion the pendulum is agitated to and fro and the stylus records on the chart a zigzag travel line about 1-4 inch wide. Inasmuch as the chart is printed to resemble a 24-hour clock dial, with graduations down to 5 minutes, it gives a complete, legible, and accurate record of the vehicle's activity during the day and night.

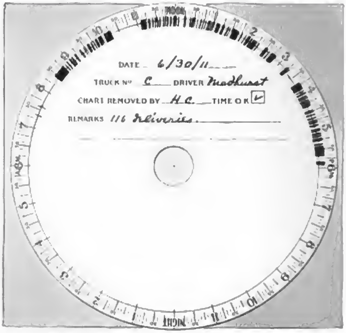

DATE 6/30/11
TRUCK No C DRIVER Madhurst
CHART REMOVED BY H.C. TIME OK ☑
REMARKS 116 deliveries.

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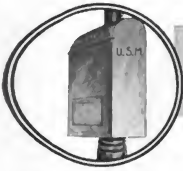
Chart Showing How Recorder Indicates Whether Vehicle Is in Motion or Not

A novel way has been devised to secure the instrument to the wagon or truck and to prevent its removal by any means short of its complete destruction. A back plate with two slots is fastened on the vehicle by three screws, which are covered by the instrument itself, which in turn is held to the back plate by two lugs fitting snugly into the slots and is made secure by a locking pin which is fastened to the back plate from inside the instrument. When the lid is closed and locked, every means of removal has been effectually sealed, and only a crowbar or sledgehammer can dislodge the recorder from its position on the vehicle.

Service Recorder Enclosed in Cylindrical Metal Disc

Showing the Position of the Recorder Under the Dash



The READERS' FORUM

Horse-Drivers or Chauffeurs?

EDITOR COMMERCIAL VEHICLE:—We have been engaged for the past few years in gradually changing our system of horse-drawn wagons for one of motor-driven vehicles, and each time that we have purchased a new truck the question of a driver has arisen. In each case there has been a lengthy discussion of the advantages and disadvantages of putting one of our former horse drivers on the new vehicle and the advantages and disadvantages of hiring a professional driver for the position. I have been in favor each time of giving one of our former horse drivers charge of the truck and have always won out. Nearly everyone else in my department is in favor of the professional driver, although we have now several commercial cars in service and have never had any trouble with any of the drivers.

In view of the fact that there seems to be a great deal of doubt at the present time as to which procedure should be adopted, I felt that a letter on the subject might be of interest to your subscribers.

The arguments of my opponents in this matter seem to be more against the use of a former horse driver than in favor of the professional. They say that the horse driver when put on a commercial car is apt to misuse the vehicle for the reason that he knows nothing about it, and if he should meet with mechanical trouble on the road his only resource would be to telephone in and have a man sent out to make the needed repair. They say also that when a horse driver is placed in charge of a motor vehicle he is apt to overload and overspeed the truck for the reason that he thinks that a truck with a motor in it is built that way to save time in making trips.

It seems to me that these are very weak arguments when it has been proved right here that no such trouble is ever had with any of our drivers. I have always contended, on the other hand, that to put a horse driver on a commercial motor vehicle constitutes a promotion for him, inasmuch as his pay is increased and he is given charge of an expensive piece of machinery, showing that the firm he works for considers him capable of being trusted. Most of these men seem to realize this and if they do not we endeavor to impress it upon them. Of course we always choose men who have shown an interest in the care of their horses and horse vehicles, and a great deal of care is exercised in selecting these men.

As far as technical knowledge is concerned, what one amongst us is not sufficiently interested in motor-driven vehicles to study up on them when the opportunity is given free and a salary continued just the same? Whenever the company from whom we purchase a truck has a school for new drivers or is willing to give the driver some instruction in the care and operation of a commercial vehicle, as most of them are, we see that the man we have selected for the position gets that knowledge. As a rule, our man masters all the points fully and as he sometimes has had experience in making repairs to his horse-drawn wagons on the road, he is of a practical turn of mind and can soon learn to make motor vehicle repairs on the road. We have a man at our stable during the day who is a first-class mechanic and if there is anything that the driver cannot repair on the road he can have this man sent out. In this way he learns the causes of trouble and their remedies by practical experience and observation.

Another point in favor of the horse driver is that he is familiar with the delivery routes and can pick the shortest course or the course over which time may be saved between the delivery points. He knows the customers of the firm also and to a certain extent at least has the welfare of the business at heart.

The professional driver, on the other hand, often does not care a rap about the business and is familiar with neither the customers nor the routes. He is consequently apt to waste time on the road either intentionally or unintentionally. He may offend a customer by being too arbitrary and in that way lose his business. Furthermore, a professional driver is usually a former pleasure car driver and likes to drive fast.

Taken all in all, professional drivers are not the men I would employ for commercial motor vehicles.

Of course there are exceptions to all rules and I know a good many professional drivers whom I would trust with our trucks and our customers just as much as I would anyone else, but what is the use of laying off a good man just to put in another who will be no better than he was, when an opening of this kind occurs?

Taking these things into consideration I feel sure that the majority of your readers will agree with me that former horse drivers are superior to professional drivers for commercial motor vehicles.—DELIVERY SUPERINTENDENT, New York City.

Advantage of the Three-Wheeler

Editor COMMERCIAL VEHICLE:—American buyers have gotten an idea into their heads that a road vehicle is not one unless it has four wheels, and this fool thought made it hard to even sell motorcycles for a number of years. Fortunately, however, the motorcycles are winning their way in, and other vehicles having less than four wheels are sure to follow. There is a greater saving from the use of a three-wheeler than most people imagine, but the fourth wheel left off should be one of the forward steering wheels, and not one of the rear driving wheels. Another way of putting this is to say that the nearest approach to the four-wheel drive is a three-wheeler, in which two-thirds of its wheels drive. It does not take a great argument to show a man in a mud hole that if he could drive more wheels he could get through better, and the three-wheeler driving two-thirds of its wheels, which carry the majority of its load, gets through bad places where the usual rig, driving but half its wheels, cannot. Further, the road resistance is less, the total dead weight is less, and the expense of running consequently less.

Engineers can design proper goods, but until the public is educated to their use we get nothing but poverty for our pains. Editors are the people who must plow the ground that we may reap a harvest.—CHAS. E. DURYEA, Saginaw, Mich.

Blasting the Rocks in Manoeuvring the Alco Truck Along a Narrow Mountain Trail, Through a Desolate Country

The Truck Wending Its Way Along a Boulder-Strewn Pass in the Desatoya Range, in the State of Nevada

At the 4145th Mile

The Alco Truck Has Reached Petaluma After a Momentous Journey of Fifty-five Days.

The Alco Truck Travelling Across the Great Salt Lake Desert in Utah, Far from Town, Railroad and Telegraph Station

THE transcontinental trip of the Alco truck is now over, and it is expected that very valuable details will be forthcoming in addition to those already published, relative to conditions met with during the long journey and how such conditions were overcome by the enterprising party. The conditions encountered were unlooked for, and were quite out of the ordinary, yet the truck has succeeded in demonstrating that the motor vehicle is able to surmount successfully the severest obstacles.

On Aug. 25 the transcontinental Alco passed the Utah-Idaho state line just north of Snowville.

On the 26th it was traveling over the Great Unknown on desert, through mountain path, far from any town, telegraph station or railroad, at one point being 110 miles away. The crew were obliged to camp in Wild West style, their meals consisting of soup, crackers and chocolate. All trace of the truck was lost for three days, while it was traveling across the great Salt Lake Desert.

At Lucin, Utah, Aug. 28, the truck encountered a blinding sand storm, a hail storm and two great cloud bursts, before it reached Kelton. At one stop during a cloud burst, the sudden rush of water carried away a bridge over which the truck was crossing. The mileage record at the end of the day amounted to 3,247.

West of Lucin many washes were encountered and these had to be filled in, in order to make the roads passable. One gully, as a result of havoc working rains, was 30 feet wide and 13 feet deep, others were as bad, and in their existing conditions these places were out of the question for the Alco or any other vehicle to attempt negotiating.

Two Hours Only to Road Construction!

On Sept. 2 the truck arrived at Wells, Nev. This day the crew had to devote 2 hours only on road construction. For 20 miles the rear wheels of the truck cut their own way in widening the roads. Between Lucin, Utah and Montello, Nev., many delays were caused by filling in gullies and overflowed trails.

After reporting at Kelton the truck headed for Elko, Nev. The heat at this time was excessive, and despite the great height of sea level the temperature hovered in the upper eighties. Through Utah good roads were encountered in contrast with the slush and mire occasioned by the floods in Wyoming. A détour to the north in Utah took the truck through well cultivated roads.

On Sept. 3 the truck arrived at Elko, the run for the day being one of many climbs, 1,700 feet being surmounted during the 24 hours, and much of it being at a constant rise. For many miles the rear wheel had to cut off both sides of narrow roadways. The afternoon journey was through intensely cold rain. The front tires also had to be taken off at times in order to permit the truck to ride along the railroad, the truck running on the rim.

Five Miles Over the Humboldt Mountains

After leaving Elko the truck had to climb 5 miles over the crest of the Humboldt mountains up a new road freshly plowed out of the washed mountain sides, through a mire made slippery by recent rains, and for a whode day into the teeth of a blinding snow storm. Just ahead of the truck traveled a 10-horse freight team carrying only half its usual load, the horses resting every 100 yards and being permitted only slight advances. The total mileage on arriving at Eureka, Nev., amounted to 3,496.

Mountain climbing was the chief work on Sept. 7, five crests being negotiated. Between the peaks were sage brush flats and roadways a foot narrower than the tread of the truck. The Alco cut its way through heavy sand 6 miles up a 20% grade. 3,586 miles were finished at Austin, Nev.

Before reaching Fallon, Nev., the crew had to blast its way through a new canyon pass. The last 20 miles of the run on Sept. 9 was over a constant succession of sand patches, while 12 miles were across an alkali flat. The weather was clear but bitterly cold.

Reno, Nev., was entered on Sept. 10 after miles through the Nevada sand which changes base with every wind storm. At Reno there were many requests for demonstrations, and the truck remained a day in the city.

On Sept. 14-15 the truck crossed the double summit of the Sierra Nevadas. The first, commencing at Carson City, was a 12-mile pull up 10 to 15% grades, narrow and sandy; the second was a shorter but harder run, as the grades were stiffer, ranging at times up to as much as 20%.

Sacramento, Cal., was reached on Sept. 16, and letters of greeting were delivered to Gov. Johnson of California. The truck was then exhibited at California's big state fair for the rest of the day. The mileage at this point was 3,929.

San Francisco was entered on Sept. 20. The Transcontinental trip was almost finished; 4,069 miles had been traveled through fifteen states. The truck was hailed with booming of guns and heralded by a big parade of gaily bedecked motor trucks. There was a big reception for the plucky crew.

On the next day the truck proceeded to deliver its load at Petaluma, 35 miles north to the Carlson-Currier Company's silk mills.

The Truck Arrives at Petaluma

On September 21 the transcontinental haul of merchandise by motor truck was over, and the 3-ton cargo was delivered for Charles W. Young & Co. Met by officers of the Chamber of Commerce of the town in automobiles, the Alco was escorted to the Carlson-Currier Co.'s mills, where the goods were unloaded, after a trip of 4,145 miles.

The Crew of the Alco Truck Building a Dam in a Flooded Section Near Evanston, Wyoming

It is the opinion of Harry S. Houpt, general sales manager of the Alco company automobile department, that the haul which has been effected points a way to the widening of delivery radii. He considers that with the improvement in road and bridge conditions throughout the country, such deliveries as interurban trips of from 100 to 150 miles will be common. Every bridge the transcontinental truck fell through gave sufficient evidence of the need of a new one, and every sandy road and every road immersed under 2 feet of water showed the need of better ones. This is one of the great results of the Alco transcontinental trip; it has drawn attention to such points.

Record of the Transcontinental Trip

Date	Total Elapsed Time Hrs.	Min	Actual Operation Time Hrs.	Min.	Number of Stops
6/20	17	20	11	45	18
6/21	13	10	7	35	24
6/22	13	20	9	20	23
6/23	13	15	8	25	15
6/24	12	50	..	..	8
6/26	13	30	11	30	13
6/27	22	5	11	10	23
6/28	9	5	6	25	15
6/29	9	..	4	35	7
6/30	19	45	13	..	20
7/2	14	45	10	55	31
7/3	15	15	6	33	26
7/4	13	30	5	11	34
7/6	10	..	5	40	23
7/7	10	..	4	43	10
7/9	13	45	8	6	19
7/10	12	45	7	..	13
7/12	13	30	8	10	18
7/13	12	40	8	45	14
7/14	14	..	6	40	12
7/15	16	.	7	24	59
7/16	13	40	3	35	28
7/17	17	30	3	35	25
7/18	7	..	5	36	15
7/19	12	..	4	48	72
7/20	12	10	4	17	100
7/25	11	.	5	..	15
7/26	11	45	6	10	51
7/27	1	25	1	5	4
7/29	12	55	8	50	19
7/30	5	40	1	27	20
7/31	5	8	1	41	26
8/1	9	57	2	28	57
8/2	6	18	..	48	18
8/3	8	15	3	21	19
8/5	4	37	3	58	8
8/6	12	55	7	21	20
8/7	10	24	3	5	34
8/8	20	3	3	28	41
8/9	11	1	3	8	42
8/10	6	3	1	6	22
8/11	2	5	1	20	6
8/13	5	20	1	53	14
8/14	11	22	4	47	29
8/15	10	25	4	8	27
8/16	17	26	9	5	46
8/19	7	46	5	23	21
8/20	7	55	5	20	16
8/22	2	5	1	..	4
8/23	4	21	2	53	5
8/24	10	10	7	20	9
8/25	8	50	5	15	10
8/26	3		1	6	7
8/27	9	50	2	36	19
8/28	12	45	5	24	36
Total	594	24	302	20	1305
Average	10	29	5	21	25

The Alco Truck Riding Dangerous Trails of Steep Ruts and High Centers Near Rock Springs, Wyoming

Riding Railroad Ties for 12 Miles in Utah. Front Tire Was Removed and the Twin Rear Tire on Right Side Straddled the Rail

Horsepower and Gear Ratio in Trucks

Continuation of E. P. Batzell's Paper—Examples of Motor Power and Torque Curves—Fuel Consumption in Relation to Torque—Conditions Affecting Thermal Efficiency

Part III

VERY similar occurrences are noticed at high speeds, beginning at the generally obtainable moment of the break in the motor power when the curve starts to drop after having reached a maximum. This gives the other, the upper unstable zone of the motor action, the difference between it and the lower zone lying in the nature of the matter determining the instability phenomenon. In the lower zone the elapsing of the motor torque is unstable, and in the upper the motor power is unstable.

Every motor should be kept between these zones of instability during its work. The difference between the revolutions per minute limiting these two zones determines the motor flexibility. Consequently this flexibility can be smaller in the motor per Fig. 6, compared with motor per Fig. 4 (see previous issue), when both are of similar construction, because in this case their upper stability speed limits are apt to be the same, but the lower limit would be at a higher revolution per minute in the first motor. Proper constructive difference may result in equal flexibility of both motors; the practical range of speeds in the first one would be shifted to the higher revolution per minute.

Motors characterized by curves like those in Fig. 5 (see previous issue), represent a type used for frequent slow-speed work, and when a smaller rate of power development at high speed does not constitute an objectionable defect. During tests they show only the upper limit of the stability range, but this is merely due to the fact that their lowest practical speed does not touch the lower limit. The lowest practical speed being dependent chiefly on the inertia masses of the rotating motor parts, sufficiently heavy flywheels permit bringing the tests within the lower unstable zone also. Motors of this class, properly dimensioned and constructed, can give a fairly high power development also at comparatively high revolution per minute. They retain a great torque value through a wide speed variation because the torque remains almost constant at the beginning, with a slight gradual drop after certain revolutions per minute. Such features render this type of motor particularly suitable for the average use in automobile vehicles, including commercial cars.

MOTORS of this class can be divided further according to special characteristic points desired for different working conditions. A pleasure car motor with comparatively high compression, uniformly acting carbureter and cooling system, large valves and free gas passages would likely give a torque curve having the least rapid drop from the initial straight constant torque direction. The corresponding power curve would be represented by a line straight at its start with a slight but increasing declination from certain revolutions per minute on when the piston speed reaches approximately 1,000 feet per minute, or much more at times. Motors with lower compressions, but otherwise identical with the former ought to have a torque curve dropping somewhat more quickly from the line of constant initial torque; their power curve, though also remaining straight for a wide speed range, would fall below the curve of the former motor, due to lower power development per cubic inch of piston displacement.

Next comes the engine type built for less intense cooling, when the thermo-syphon or the air-cooling systems are used, giving more pronounced character to their influence upon the engine action. This is generally a low-compression type, not dimensioned to permit high volumetric cylinder filling even at medium speed, although there are exceptions to this rule. The power curve declines from the straight direction at low speed and the torque drops gradually but faster than in the former examples of engine types.

BELOW are shown a few examples of motor curves published elsewhere. In Fig. 7 curves I are of an Arrol-Johnston four-cylinder, four-inch by 5-inch motor; curves II are of an earlier Knight motor; curves III are of a Franklin engine, but different from those represented in Fig. 3. These curves can be referred to the three above-mentioned engine types, in which the compression may be one of the factors effecting their action difference, together with the shape and size of inlet and exhaust valves and passages. The motor of the first Thomas taxicab, curves of which are shown at IV in Fig. 7, serves as a good example of the action of a high compression engine with small valves and strangled gas passages. Its curves denote a rapid sinking of the power and torque with the increase of revolutions per minute, but on account of the high compression ratio, 4.7, the motor has a fair rate of power development even at high speed. This motor must have a very efficient cooling system to insure reliable functioning.

The foregoing gives sufficient explanation and information about the items of motor characteristics which are apt to enter into the question of fuel consumption in relation to torque. The maximum thermal efficiency is generally not reached at slow speed, but well within the range of medium or high revolution per minute, according to the conditions of each individual case. Consequently it would be located at considerably higher speed than the torque maximum, which in good construction does not overstep the limit estimated for the low speed range of a motor. Special constructions are excluded from this statement. The reciprocal influence of the thermal efficiency and the motor torque must be determined to find the character of the fuel consumption and where the most economical revolution per minute may be anticipated before or after the moment of greatest torque. The thermal efficiency of a gas engine can be expressed in general by many equations, depending on the factors one prefers to include. One of such equations, giving the efficiency, E, through the absolute temperatures, t, and, T, before and after the compression stroke, reads as follows:

$$E = 1 - \frac{t}{T}.$$

The gas charge freshly drawn into a cylinder at slow speed has a comparatively longer time to become warmed up through contact with the cylinder walls than at higher revolutions per minute. Consequently the temperature, t, of the fresh charge before the compression stroke, is higher at slow speed, which accordingly reduces the thermal efficiency of the working cycle as per above equation. Moreover, on account of the cylinder walls being cooler than the gases inside of them during the latter part of the compression stroke, the gases lose more heat through the walls at slow speed than the available time permits at high speed. This reduces the final compression temperature, T, of the above equation, further lowering the thermal efficiency. Facts such as these act on the motor working cycle so that at higher speed the cycle elapses between temperature limits more favorably related for the efficiency, although the whole range of temperatures may be lower.

The former equation expresses the thermal efficiency of a theoretical cycle, but for the efficiency of the whole actual working cycle it is not enough to take into consideration the losses during the compression stroke only. Those occuring during the other strokes must be added. Overlooking the influence of motor speed on the losses during the exhaust stroke during the expansion more heat is likely to be lost at slower speed again on account of more time being available for the heat exchange between the hot gases and the cooler cylinder walls. Thus all temperature losses are found to be greater at lower motor revolutions per minute and the reciprocal relation between the temperatures indicates that the curves of the cycle pressure diagram approach the theoretical adiabatic shape more closely at higher speed notwithstanding that the percentage of burnt gases in the fresh ones increases at the same time. The volume of fresh gases decreases with rising speed, but the amount of burnt gases left in the combustion chamber after the previous exhaust remains practically constant, providing the exhaust passages are of proper size; hence there is a weaker and less efficiently burning charge at higher r.p.m.

THE motor speed at which the gain through decreasing heat losses is offset by the lowering quality of the explosive charge corresponds approximately to the moment ot maximum thermal efficiency. The curve representing this efficiency has a slightly upward direction until its maximum is reached and the drop which follows occurs with increasing rapidity. See curve E in Fig. 6 (in previous issue).

The location of its maximum is influenced by the motor construction, the conditions of carburetion, depending on the state of the fuel and air, by the intensity of the cooling system, etc. The nature and combined influence of these items result in making the dilution of the charge or the heat losses of predominating value at a certain speed. A motor of T-head cylinder construction, working at high compression, is apt to have the moment of equivalent heat losses and charge quality at a higher speed than a low-compression motor of a type affording small cylinder cooling surface. Similarly, a motor with large valves and passages should have its greatest thermal efficiency at a higher speed than another which is choked in its inlet or exhaust passages.

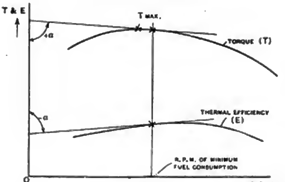


Fig. 7a

Some conditions affacting the thermal efficiency and the respective maximum do not remain unchanged throughout the whole service. Thus deposits of carbon inside the cylinder render its cooling more difficult, reducing the heat conductivity of the walls. Such a state of the motor transforms its action into one similar to that in constructions with small cooling surfaces. Therefore the maximum of its thermal efficiency corresponds to lower revolution per minute. The same result will be detected in motors of which the exhaust passages, exhaust pipe and muffler have become clogged with sediment of the escaping gases. This will naturally cause a higher back pressure during the exhaust stroke, which will increase the quantity of spent gases remaining in the combustion chamber, offsetting the decrease of heat losses earlier by impairing the quality of the charge. The temperature of the air, the grade of fuel, the carbureter system, conditions of the ignition, etc., may influence the thermal efficiency. Therefore the foregoing discussion in regard to the latter, as being governed by the heat losses and the volumetric filling, remains true with different constructions only when all items enter into the matter evenly. It follows that the moment of most economical motor speed with the least fuel consumption per horsepower lies somewhere between these two maxima, and where the influence of the decreasing torque development is compensated by the rising thermal efficiency.

Speaking graphically, the point of minimum fuel consumption will correspond to the revolutions per minute, the intersections of which ordinate with the torque and efficiency curves represent the touching points to them of such straight lines, which both have equal angles with the coordinates, but of reversed denomination—one angle is positive when the other is negative, Fig. 7a. Of course, the scale units for the torque and efficiency curves must be properly selected if a graphical method of finding the minimum of fuel consumption shall give correct results.

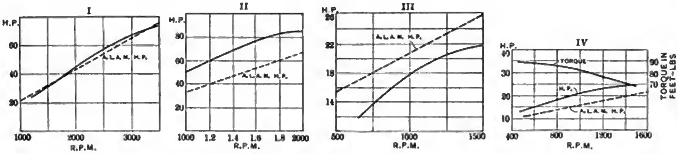
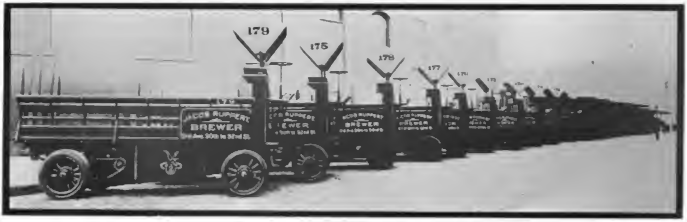


Fig. 7

TRADE AND PERSONAL MISCELLANY



Part of a Fleet of Eighty-Three Electric Trucks in the Service of Jacob Ruppert, Brewer, New York City. These Were Purchased from the General Vehicle Co.

The Croxton Motor Car Co., Washington, Pa., recently removed to its new factory.

H. W. Johns-Manville Co., New York City, has issued a circular describing their J-M spark plug.

Detroit Lubricator Co., Detroit, Mich., has issued a catalogue describing its different styles of lubricators.

L. J. Hadley has been appointed manager of the truck sales for the Northwest KisselKar branch, Minneapolis, Minn.

The Mora Power Wagon Co., Cleveland, O., recently sent out a folder entitled "About Cost of Operating a Mora."

The Hess-Bright Mfg. Co., Philadelphia, Pa., has moved to their new factory at S. E. corner of Front street and Erie avenue.

W. R. Shaw, Syracuse, N. Y., reports a growing trade for Sandusky trucks, for which vehicle he took the local agency this summer.

Herbert G. Fitch, formerly with the Willys-Overland Co. of Toledo, has been appointed general manager of the Garford Co. of Elyria, O.

J. S. Bretz Co., New York City, manufacturers of F. & S. ball bearings, recently sent out a price list on its German chrome steel balls.

The Victor Co., Springfield, O., is increasing its capacity in order to take care of the rapidly increasing business in its truck tire department.

Henry Lumbach has resigned his position as assistant engineer of the R-C-H Corporation to accept a position with the Studebaker Corporation as chief tool maker.

The Continental Motor Mfg. Co., Muskegon, Mich., has sent out a catalogue entitled "Motors Plus Individuality," giving specifications of different size motors.

F. N. Phelps and A. F. Neale have taken new headquarters at 801 Boylston street, Boston, Mass. They represent the Baker Motor Vehicle Company in that city.

R. E. Beedee, Davenport, Ia., has become connected with the St. Louis, Mo., branch of the Wilcox Motor Car Co., Minneapolis, Minn., as assistant general manager.

B. F. Goodrich Co., Akron, O., has issued a catalogue entitled, "Birthday Number," describing how rubber is gathered and shipped and showing tires on trucks, etc.

W. C. Ruckert has succeeded C. B. Clement as Spokane manager of the Goodyear Tire & Rubber Co. Mr. Clement has joined the Studebaker agency in Portland, Ore.

The Bosch Magneto Co., New York City, recently issued two catalogues, one devoted to the automobile and gas engine industry and the other on high-tension magneto.

George I. Pound, New York City agent for the Rowe Motor Co., has removed his office to 131 East Eighteenth street and spare department to 406 East Seventy-ninth street.

The Studebaker Corporation, of Atlanta, Ga., has arranged for the construction of a four-story fireproof building at Peachtree and Harris streets, for its branch in this city.

R. L. Morgan has severed his connection with the Morgan Motor Truck Co., Worcester, Mass. He has taken a suite of offices in the Peoples Saving Bank Building, 452 Main street.

F. B. Patrick has joined the advertising and sales department of the Victor Rubber Co., of Springfield, O. He was formerly of the advertising staff of the Chicago Evening American.

Carroll A. Haines & Co., distributors of the Baker electric vehicles in Philadelphia, has moved to its new salesrooms at 1927 Market street.

W. C. VanSant has been appointed district manager for the Pacific Coast territory of the Chase Motor Truck Co. For several years past he has been traveling salesman in the West.

Frank R. Talbott has become associated with the force of the Victor Rubber Co., of Springfield, O. He was for a number of years prominently connected with the Akron rubber companies.

C. W. Moody, of Cleveland, O., recently severed his connection as district manager of the Chase Motor Truck Co. Royal B. Curtis has succeeded him.

Frank E. Carroll has accepted the position as manager of the San Francisco, Cal., branch of the Goodyear Rubber & Tire Co. For some time past he has been manager of city sales in the local branch.

H. M. Lawson, Phoenix, Ariz., has inaugurated a regular automobile passenger service between Phoenix and Mesa, 18 miles east. Several trips are made a day with a Stanley Steamer sightseeing machine.

G. L. Mitchell has become a partner in the Republic Rubber Company, Detroit, Mich. He was formerly manager of the Toronto branch of the Diamond Rubber Company, from which firm he resigned.

William L. Day has been appointed vice-president and general manager of the General Motors Truck Co., Pontiac, Mich. He was formerly general sales manager of the Mitchell-Lewis Motor Co., of Racine, Wis.

John J. Kroha has accepted the position as Milwaukee representative of the motor truck division of the A. O. Smith Co., of Milwaukee, Wis. He was formerly contracting freight agent for the Wabash system in this city.

The Sternberg Mfg. Co., Milwaukee, Wis., recently opened a direct factory service branch and maintenance bureau in New York City, being operated by the Sternberg Motor Truck Co., of New York, at 285 East 137th street.

The Stegeman Motor Car Co., Milwaukee, Wis., has leased the big manufacturing plant at Woodworth, Linus and Kinnickinnic avenues, Milwaukee, and will at once increase its capacity to one truck per day, or 360 per year.

The Stegeman Motor Car Co., of Milwaukee, Wis., is now established in its new plant, with general offices at 606 Linus street. Their new factory will increase the present capacity and give them an annual output of 500 trucks per year.

C. Arthur Benjamin, Inc., Syracuse, N. Y., recently made an important sale of ten Packard trucks, of varying capacities, to The Solvay Process Company, of Solvay, near that city. These are to be delivered as quickly as possible.

A. J. Jackson, for several years representative for J. H. Lewis, Syracuse, N. Y., has secured the agency for the Federal truck and projects a vigorous selling campaign. He was formerly with the Pierce Arrow Company, Buffalo, N. Y.

Frank H. Trego has been appointed to take charge of the department of research engineering for the Packard Motor Car Co. He was formerly chief engineer of the E. R. Thomas Motor Car Co., and has returned to Detroit from Buffalo.

A new concern to manufacture a new patent spark plug has been incorporated in Toledo, O., with a capital stock of $15,000. Incorporators are Fred Hummell, C. D. Few and Clifford Stone. The plant will be located in the Snow Flake building.

Garvin Denby has been appointed sales manager of the Federal Motor Truck Company, Detroit, Mich. He is the brother of Senator Edwin Denby and was recently connected with the Solvay Process Company, as assistant to the president.

Day Baker, manager of the New England branch of the General Vehicle Co., was recently called to New York by the company for the purpose of going over the details of the new Mercedes gasoline truck which is to be built by the General Vehicle Co.

C. E. Holmes, formerly of the Diamond Rubber Co., Goodyear Tire & Rubber Co., and late manager of the Swinehart Tire & Rubber Co., recently resigned his position to enter into the retail tire and vulcanizing business in Birmingham.

The Ford Motor Car Company, Chicago, Ill., has purchased an entire block of land in that city. The company intends building a five-story building which will be used as a warehouse, garage and assembling plant. It will also contain show and saler rooms.

Russel A. Shields has resigned his position with the Studebaker Corporation to become associated with the sales department of the Chalmers Motor Company, with headquarters at Detroit, Mich. He was employed as testing engineer with the former company.

R. & L. Company, New York City, comprising of J. T. & J. A. Rainier and Paul Lineberger, recently completed arrangements whereby they took control of the Garford business in Boston to operate in connection with the New York agency as a sub-branch.

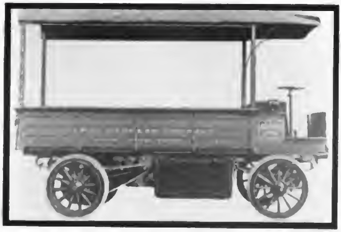
B. F. Goodrich Co., Akron, O., has begun the construction of a six-story office building and is also having built a two-story addition to its present quarters. It is hoped that this will be adequate for handling the rapidly growing business interests of the concern.

Gleeson Murphy, who has temporarily held the office of vice-president and general manager of the General Motors Truck Co., Pontiac, Mich., in connection with his other work, will devote himself exclusively to his regular duties of assistant to the president of the company.

Minnesota Carter Car Company has been organized with A. R. Workman, formerly of Ainsworth, Neb., as president. A factory branch of the Carter Car Company, with Minnesota, Montana, the Dakotas and northern Wisconsin as the distributing territory, will be established.

The International Motor Company, New York City, has made an agreement with the Canadian Fairbanks-Morse Company, for the establishment of a chain of service stations throughout

Two Pictures of General Vehicle Trucks, the First One of Sixty-Seven Trucks in the Service of the American Express Co., the Second Owned by Sulzberger & Sons Co., New York City



Lansden Electric Truck Owned by the Adams Express Co., Who Have Eleven of These in Service.

A Fine Fleet of Lansden Electrics Owned by Abraham & Straus, Dry Goods Merchants, New York

Canada. The principal stations will be at Montreal, Toronto, Winnipeg and Regina.

The Genesee Motor Car Company, Syracuse, has announced the opening of a station similar to that of the Chase Motor Truck Company, and other concerns are following the lead and the Chase people regard the step as conducive to future success of the truck sales market locally.

C. L. Morgan has resigned his position as sales manager of the electric division of the General Motors Truck Co., Pontiac, Mich., to become associated with the Moon-Hopkins Billing Machine Co., of St. Louis, as Eastern sales agent. His headquarters will be at 330 Broadway, New York City.

The Reliance Truck and Garage Company are building a large addition to their garage at 111-115 E. Lynn street, Columbus, O., to meet the increasing demand for motor truck service. Special provisions will be made for the storage and maintenance of motor trucks of both gasoline and electric types.

L. A. Smith has resigned his position with the Studebaker Company in Dallas, Tex., with whom he has been connected for many years, and has formed a partnership with G. L. McKinney, of Amarillo, Tex. They will open an agency covering Hunt, Collin and Rockwell counties and will sell Studebaker cars.

Charles F. Monroe, sales manager of the United States Motor Co.'s local branch which was known as the United Motor Buffalo Co., Buffalo, N. Y., has purchased the Buffalo interests of the former concern and has applied to the United States Supreme Court to change

Commercial Vehicle Incorporations

Ideal Steel Wheel Co., Cincinnati, O. To manufacture steel motor vehicle wheels and other accessories. Capital, $500,000. Incorporators: J. H. Fitch, J. E. Strietelmeier, E. H. Maffey, H. L. Mattox, H. E. Walker, Louis J. Dolle and W. R. Walker.

Bond Hill Auto Service Co., Bond Hill, O. To do a freight and passenger service between Cincinnati and Bond Hill. Capital $2,000. Incorporators: Jacob Glos, John F. Ahlers, Joseph H. Arlinghouse, Arthur Pohlman and W. A. Earls.

Viking Mfg. Co. of New York, New York City. Manufacturing motor trucks, etc. Capital, $25,000. Incorporators: Arthur R. Bengs, Richard Condon and Albert O. Briggs.

Roulements E. DeBois Ball Bearing Co., New York City. To manufacture ball bearings, etc. Capital, $25,000. Incorporators: John S. Sherman, W. W. Sherman and H. T. Sherman.

Milbridge Motor Co., Milbridge, Me. Capital, $10,000. Incorporators: Joseph W. Sawyer, James S. Wyman and Allan A. Wallace.

B. & P. Sales Co., Inc., Boston, Mass. Motor vehicle business. Capital, $50,000. Incorporators: R. H. Skinner, Grace B. Bowman and L. A. Brimmer.

Fenway Garage Co., Boston, Mass. Capital $250,000. Incorporators: J. C. Cannon and C. W. Engle.

Overman Tire Co., Wilmington, Del. To manufacture motor cars. Capital $3,000,000. Incorporators: E. E. McWhitney, N. P. Coffin and H. E. Latter.

Dillman-Melin Motor Co., Richmond Hill, N. Y. To manufacture motors. Capital $20,000. Incorporators: William C. Dillman, Richard A. Dillman, Bern W. Melin, W. J. Bissell and Fred J. Hoerlein.

Pacific Auto Co., Vancouver, B. C. To engage in taxicab business. Capital $500,000. Incorporators: Noel Humphreys, G. M. Gibbs, A. S. French and J. L. Langan.

International Motor League, Inc., Buffalo, N. Y. To deal in motor vehicles, etc. Capital $1,000. Incorporators: Julius J. Evring, Frederick A. Hipp and Henry C. Aman.

Trevent Tire Co., New York City. To manufacture tires. Capital $100,000. Incorporators: N. A. Sterling, M. Rachmil and S. King.

A. W. Halle Motor Co., Buffalo, N. Y. Capital $25,000. Incorporators: A. W. Halle, B. H. Phillips and E. C. Scheneker.

Berkeley Motor Car Co., Boston, Mass. Capital, $1,000. Incorporators: F. H. Freeman, Eugene Stanton and H. A. Weymouth.

Morgan Motor Truck Co., Worcester, Mass. Capital, $300,000. Incorporators: C. B. Foster, Evan F. Jones and C. H. Derby.

Knickerbocker Havers Co., Inc., New York City. Motor vehicles, etc. Capital, $50,000. Incorporators: Erastus M. Cravath, Albert C. Hubbel and Burwell M. Crosthwaite.

Commercial Delivery Co., New York City. To deal in auto delivery cars, trucks, etc. Capital, $500. Incorporators: Abraham Miller, Nathan Tarakan and Louis Tarakan.

Cameron Mfg. Co., Beverly, Mass. To deal in motor vehicles, etc. Capital, $300,000. Incorporators: E. S. Cameron, Albion B. Emerson and H. P. Cameron.

Whyle S. Merritt Co., New York City. Engines, motors, etc. Capital, $10,000. Incorporators: Paul Thamm, Seneca W. Merritt and Clyde V. Morse.

Continental Motors Corp., Buffalo, N. Y. Capital, $100,000. Incorporators: Gordon F. Matthews, Frank V. Whyland and Allen E. Cheate.

Federal Motor Supply Co., Cincinnati, O. To manufacture and sell all kinds of motor vehicles, parts and accessories. Capital, $250,000. Incorporators: George W. Platt, Emil C. Schmitt, R. L. Dollings, A. M. Bradily and M. F. Platt.

Royal Blue Line Co., Boston, Mass. To deal in motor cars. Capital $100,000. Incorporators: W. F. Smith, C. H. Poole and C. F. Smith.

Hand Corp., Grand Rapids, Mich. To manufacture motor cars. Capital $30,000. Incorporators: O. H. L. Wernicke, H. C. Cornelius, G. H. Hand, J. A. Whitworth, L. A. Cornelius and G. G. Whitworth.

Economy Tire and Rubber Co., Harrisburg, Pa. To manufacture and deal in rubber tires, etc. Capital $5,000. Incorporators: E. L. Craft, E. M. Knupp and B. F. Knupp.

V. O. Motor Truck Co., Lynn, Mass. Capital $100,000. Incorporators: John M. Nelson, John P. Stevens, W. T. Langwald, J. P. Crosscup, C. N. Alley and S. D. Ritchie.

Republic Motor Co., Stillwater, Minn. To manufacture motor cars. Capital $10,000. Incorporators: G. H. Sullivan, L. L. Manwaring and P. H. Gulford.

Landman-Griffith Co., Toledo, O. To deal in and repair motor cars. Capital $10,000. Incorporators: C. P. Landman, C. K. Freidmen, W. E. Griffith, H. Landman and G. D. Griffith.

F. A. Dutton Motor Co., Boston, Mass. Capital, $25,000. Incorporators: F. A. Dutton, Charles H. Farnsworth and J. C. Smith.

Harley Co., Springfield, Mass. Motor vehicle business. Capital, $50,000. Incorporators: Leon J. Harley, Jr., L. K. Harley and T. B. Purves, Jr.

Tyler Bros. Corp., Boston, Mass. Motor vehicle business. Capital, $100,000. Incorporators: F. J. Tyler, Lucius S. Tyler and J. W. Gibbs.

W. H. Webster Jones Co., Boston, Mass. To deal in power vehicles, etc. Capital, $15,000. Incorporators: W. H. Jones, Webster Jones and G. L. Ellsworth.

Miller, Hicks & Hewitt, Inc., New York City. Motor vehicle business. Capital, $10,000. Incorporators: Harry D. Miller, Henry T. Hicks and George A. Hewitt.

Mercedes Daimler Selling Corp., New York City. Motor vehicle business. Capital, $50,000. Incorporators: A. M. Becker, John A. Lemline and E. H. Ferguson.

The New York Electric Vehicle Ass'n, Inc., New York City. Motor vehicle business especially electrics. Capital, $50,000. Incorporators: George Tiernan, Frank H. Parcels and Robert G. Itebiefsen.

Drage Harris Motor Truck Sales Co., Ft. Wayne, O. Capital $10,000. Incorporators: F. A. Drage, D. H. Harris and H. L. Somers.

Dahl Punctureproof Tire Co., Pierre, S. D. Capital $6,000,000. Incorporators: A. N. Dahl, F. H. Lewis and F. H. Stevens.

Salisbury Ball Bearing Mfg. Co., Wilmington, Del. Capital $100,000. Incorporator: B. Ralph Ewart.

L-A-W Motor Truck Co., Wilmington, Del. To engage in motor truck business. Capital $200,000. Incorporator: G. G. Rheubyn.

Wizard Mfg. Co., St. Joseph, Mich. To manufacture and sell improved carburetors and motor vehicle accessories. Capital $[illegible]000. Incorporators: Frank A. Sharpe, Thomas Robinson and Gerald C. McDowell.

Benton Motor Car Co., Benton, Ill. To manufacture and deal in motor cars and accessories. Capital $75,000. Incorporators: [illegible] H. Stetler, W. S. Cantrell and A. H. Fa[illegible]fleder.

Puritan Motor Supply Co., Boston, Mass. Capital $5,000. Incorporators: J. G. M[illegible]mack, Jr., W. E. Hearn and R. W. [illegible] the name of the concern to the Monroe Motor Car Co.

The Marathon Motor Car Company, a concern organized in Cincinnati, O., by Harry Welland, well known in the local field of motor capitalists, will build a fireproof building for the new concern at Florence and Gilbert avenues, where salesrooms will be established. Fred H. Berold, of Cleveland, is interested and $18,000 will be invested.

C. K. Thomas, formerly with the Lnkenheimer Co., of Cincinnati, and later with the Best Mfg. Co., of Pittsburgh, Pa., is another recent addition to the staff of district managers of the Chase Motor Truck Co. His headquarters will be in St. Louis, and he will have oversight of a territory including Kansas, Missouri, Texas, Arkansas and Oklahoma.

Weston-Mott Co., Flint, Mich., large manufacturers of axles, hubs and rims, has established a branch at 136 Longacre, London, W. C., England, and the building of a large export trade will be pushed with vigor. Samples have already been shipped to several English manufacturers and also samples of the lightest type of axles have been shipped to Australia.

The Moore Motor Truck Company, Waterville, O., is considering the advisabilty of erecting large shops for the building of its vehicles near Toledo. While nothing definite has been decided it seems to be the consensus of opinion among the officials that Toledo is the best available point and it is probable that plans will soon be drawn for the new buildings.

The Speedwell Motor Car Company, Dayton, O., has established a branch in San Francisco, Cal., taking over the interests of the Speedwell Motor Car Company, of California. R. Harry Croninger is manager. He is also manager of the motor truck department of the Dayton factory and while retaining his factory position he has no definite plans for returning to Dayton.

The A. W. Haile Motor Company has been incorporated to handle retail Studebaker sales in Buffalo, N. Y. A salesroom has been rented of the Studebaker Corporation of America, at 1015-1017 Main street, with Arthur W. Haile as president and general manager and Bradley H. Phillips as secretary and treasurer. This company will also handle retail Studebaker sales in Erie and Niagara counties.

Royal B. Curtiss has been appointed district manager of the Chase Motor Truck Co., with headquarters in Cleveland, O. He resigned his position with the Royal Equipment Co., where he was sales manager up to September 1. He will have jurisdiction over the following territory: Ohio, West Virginia, Kentucky, Illinois, except the vicinity of Chicago, Michigan and western Pennsylvania.

Fenway Garage Co., Boston, Mass., is building a two-story garage of reinforced concrete and will be located at Lansdown and Ipswitch streets. This building is to have all the latest improvements, principally a concrete ramp from the street level to the first floor, which will be a short distance below the street level, and also to the second floor, which will eliminate elevator service. This company will take care of trucks, etc.

L. C. Van Bever, vice-president of the Canadian company of the Goodrich Tire & Rubber Co., Toronto, Can., left for England to complete arrangements for the opening of a London branch, and to establish a complete distributing system throughout the British Isles. The Goodyear Tire & Rubber Co. are preparing to open branches in several of the countries in Continental Europe with head offices in London, South Africa and Australia.

General Manager D. K. Black of the Seagrave Co., Columbus, O., announces that a large number of contracts have been booked recently. Among the number are two aerial trucks and a combination wagon at Canton, O., a combination wagon at Mansfield, O., a hook and ladder truck and three combination wagons at Davenport, Ia., two combination wagons at Butte, Mont., and one wagon at Winona, Wis. Contracts are being booked every day.

The Chase Motor Truck Company, Syracuse, N. Y., reports great success throughout the country with its new Model M express truck, built to meet the needs of small dealers. Deliveries began September 1, and the company is now filling orders for 150 machines. It is intended to manufacture 1000 of them ere the year's end. Description of this new model will be found in our "New Car" department.

The Chase Motor Truck Company, Syracuse, N. Y., reports the most favorable results from its truck service station recently established on West Genesee street.

Studebaker Corporation of America, Chicago, Ill., have sold to J. W. Kain a commercial vehicle which is used in the saw filing business. The body is 72 inches inside, permitting workmen to stand erect and work at a bench which is equipped with tools, vise, etc. The body has only one door, which in the accompanying illustration is shown open. There is a half seat in the body which permits the occupant to enter through the open door and gives him easy access to the space back of the seat. Mr. Kain covers the entire city of Chicago with this vehicle, being able to cover more than twice the amount of territory than with a horse wagon.

Kissel Motor Car Co., Hartford, Wis. has acquired an additional plant at Milwaukee, Wis. The floor space will be 200,000 square feet. This means double the output and it is a most important move in the history of the company

Two Studebaker Electric Trucks in the New York City Service of Gimbel Brothers, the Big Department Store

Factory of the Motor Truck Body Co., Detroit, Mich.

New Commercial Vehicle Agencies

Place	Car	Agent
Erie, Pa.	Lippard-Stewart	Stirling Bros. Co.
Portsmouth, O.	Lippard-Stewart	David Stehler.
Boston, Mass.	Babcock	F. A. Dutton Motor Co.
Chattanooga, Tenn.	Packard	Bill Jones Automobile Co.
Corsicana, Tex.	Kelly	L. H. Lee.
Lynchburg, Va.	Kelly	Monte Dingee.
Chattanooga, Tenn.	Kelly	Bryan Transfer Co.
Richmond, Va.	Kelly	Shenandoah Motor Co.
Emporia, Va.	Kelly	Emporia Machine Co.
Cumberland, Md.	Kelly	Queen City Garage.
St. Louis, Mo.	Speedwell	Speedwell Motor Co.
Syracuse, N. Y.	Alco	Jefferson Garage Co.
Rochester, N. Y.	Alco	Pawlig & McGuldwin.
Reading, Pa.	Alco	Merchants Auto Service Co.
Minneapolis, Minn.	Alco	Downs Co.
Kansas City, Mo.	Alco	William Motor Car Co.
Havana, Cuba	Alco	Villamil & Miller.
Detroit, Mich.	Alco	Thompson Auto Co.
Detroit, Mich.	McIntyre	A. C. Applebaum.
Springfield, Ill.	McIntyre	W. S. Crowder.
E. Palestine, O.	McIntyre	E. Palestine Garage.
Pettisville, O.	McIntyre	Wyse & Maistar.
Butler, Pa.	McIntyre	C. M. Hilliard.
Plymouth, Pa.	McIntyre	H. J. Wagner.
Chester, Pa.	McIntyre	Chester County Garage.
Butte, Mont.	McIntyre	E. Wiley Hill.
Fresno, Cal.	McIntyre	McKee & Scott.
Streator, Ill.	McIntyre	Star Garage.
Pawnee, Ill.	McIntyre	E. L. Farnam.
Davenport, Ia.	McIntyre	Davenport Auto Co.
Schenectady, N. Y.	McIntyre	J. J. Aker.
New York City	McIntyre	Browns & Co.
Stamford, Conn.	McIntyre	Mechaley Auto Co.
Seattle, Wash.	McIntyre	Herbert S. Thorpe.
Boston, Mass.	McIntyre	Standard Motor Truck Co.
Auburn, Ind.	McIntyre	McNabb & Carter.
Etna Green, Ind.	McIntyre	Coar Garage.
Vancouver Isle, B.C.	Federal	Vancouver Isle Motor Co.
Portsmouth, O.	Federal	David Stehler.
St. Louis, Mo.	Federal	Allen Baker.
Melbourne, Austra.	Federal	American Motor Truck Co.
Buffalo, N. Y.	Universal	Mason B. Hatch.
Pittsburgh, Pa.	Universal	Pittsburgh-Chalmers Co.
Toledo, O.	Universal	Thomas W. Bunnell.
Cleveland, O.	Universal	Koepke Motor Sales Co.
San Diego, Cal.	Universal	Paxton Motor Car Co.
Kansas City, Mo.	Packard	Packard-Kansas City Co.
Indianapolis, Ind.	Packard	Carl G. Fisher & Co.
Memphis, Tenn.	Packard	Jerome P. Parker-Harris Co.
Syracuse, N. Y.	Federal	A. J. Jackson.
Toledo, O.	Moore	Fred Kopf.
Atlanta, Ga.	Federal	Cola Motor Co. of Ga.
Buffalo, N. Y.	Federal	Sanderson & Burghardt.
Columbia, S. C.	Federal	Gibbes Machinery Co.
Cleveland, O.	Federal	Eckenroth Sales Co.
Davenport, Ia.	Velie	Davenport Auto Truck Co.
Davenport, Ia.	White	Davenport Auto Truck Co.
Larned, Kan.	Federal	W. S. Young.
Mobile, Ala.	Federal	Mobile Auto Co.
Memphis, Tenn.	Federal	John F. Cubbins.
New Orleans, La.	Federal	Fairchild Auto Co.
Pittsburgh, Pa.	Federal	Union Motor Car Co.
Sioux City, Ia.	Federal	Interstate Auto & Supply Co.
Tecumseh, Mich.	Federal	L. C. Hayden.
Tonom, Ont.	Detroiter	Consolidated Motors.
Watertown, Wis.	Chase	Buroff-Fuller Motor Co.
Washington, D. C.	Pierce Arrow	Foss-Hughes Co.
Washington, D. C.	G. M. C.	G. E. Chapman.
Washington, D. C.	Lauth-Juergens	Warren Motor Sales Co.
Winnipeg, Can.	Mack	Canadian Fairbanks Morse Co.
Boston, Mass.	Marmon	F. E. Wing Motor Car Co.
Melbourne, A'tralia.	Federal	American Truck & Auto Co.
Boston, Mass.	Vearac	W. L. Russel Co.
Dubuque, Ia.	Kissel	Lippert-Bishop Auto Co.
Lone Tree, Ia.	Kissel	Zimmerman Steel Co.
Longview, Tex.	Kissel	W. D. Sessum
Kaufman, Tex.	Kissel	J. C. Bryant
Marshall, Mo.	Kissel	H. Lowenstein & Co.
West Point, Neb.	Kissel	Brown Bros.
Sedalia, Mo.	Kissel	W. C. Evans
LaCrosse, Wis.	Kissel	Fox Bros.
Kalamazoo, Mich.	Kissel	Wm. C. Greca
Battle Creek, Mich.	Kissel	B. C. Kirkland
Rochester, N. Y.	Kissel	Ball-Washburne Motor Co.
Washington, D. C.	Kissel	Edward H. Bauer
Salisbury, Md.	Kissel	L. D. Collier
Nashville, Tenn.	Kissel	Howard Douglas
Regina, Sask, Can.	Kissel	D. L. Boureau
Carbondale, Ill.	Kissel	Chas. F. Hamilton
Mineral Wells, Tex.	Kissel	L. M. Dunn
San Angelo, Tex.	Kissel	W. A. Bell
Phoenix, Ariz.	Kissel	Wesley A. Hill
Marinette, Wis.	Kissel	Myron R. Churchill
Salisbury, Md.	Kissel	L. D. Collier
Jersey City, N. J.	Kissel	B. & H. Garage
Syracuse, N. Y.	Kissel	George Finck
New Rochelle, N. Y.	Kissel	H. A. Fuller & Co.
Calgary, Alberta	Kissel	H. H. Kerr
Montreal, Que.	Kissel	J. D. Lapointe
St. Johnsbury, Vt.	Kissel	Percival & Silsby
Regina, Sask.	Kissel	D. L. Boureau
Boston, Mass.	I. H. C.	International Harvester Co.
Brandon, Man.	I. H. C.	International Harvester Co.
Buffalo, N. Y.	I. H. C.	International Harvester Co.
Calgary, Alta.	I. H. C.	International Harvester Co.
Cedar Falls, Iowa	I. H. C.	International Harvester Co.
Charlotte, N. C.	I. H. C.	International Harvester Co.
Cincinnati, O.	I. H. C.	International Harvester Co.
Cleveland, O.	I. H. C.	International Harvester Co.
Columbia, S. C.	I. H. C.	International Harvester Co.
Columbus, O.	I. H. C.	International Harvester Co.
Concordia, Kan.	I. H. C.	International Harvester Co.
Council Bluffs, Iowa	I. H. C.	International Harvester Co.
Crawford, Neb.	I. H. C.	International Harvester Co.
Davenport, Iowa	I. H. C.	International Harvester Co.
Denver, Colo.	I. H. C.	International Harvester Co.
Des Moines, Iowa	I. H. C.	International Harvester Co.
Detroit, Mich.	I. H. C.	International Harvester Co.
Dubuque, Iowa	I. H. C.	International Harvester Co.
East St. Louis, Ill.	I. H. C.	International Harvester Co.
Eau Claire, Wis.	I. H. C.	International Harvester Co.
Edmonton, Alta.	I. H. C.	International Harvester Co.
Elmira, N. Y.	I. H. C.	International Harvester Co.
Evansville, Ind.	I. H. C.	International Harvester Co.
Fargo, N. D.	I. H. C.	International Harvester Co.
Fort Dodge, Iowa	I. H. C.	International Harvester Co.
Fort Wayne, Ind.	I. H. C.	International Harvester Co.
Grand Forks, N. D.	I. H. C.	International Harvester Co.
Grand Rapids, Mich.	I. H. C.	International Harvester Co.
Green Bay, Wis.	I. H. C.	International Harvester Co.
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A Studebaker Commercial Vehicle Used in Chicago in the Saw Filing Business

The COMMERCIAL VEHICLE

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CONTENTS

Operating the Electric Vehicle 5
Truck Exhibits at the New York Electrical Exposition and the Boston Electric Show 12
Some Electric Models at the New York Electrical Exposition 14
Electric Clans in Conclave—The Third Annual Convention of the Electric Vehicle Association of America 16
Horse and Electric Delivery Compared 23
The Problem of the Second-hand Truck 26
Electric Conditions 29
Systems for Maker and User—Private Garages for Electric Vehicles 30
The Editor's Viewpoint 36
The Cost of Operating Gasoline Tractors 38
Important Plowing Tests at Bourges for French and American Machines 42
Idle Time in Loading 44
Grade Crossings Law 45
Activities in the Motor Truck World 46
Trade Conditions Throughout the Country 48
The Ward Bread Co 50
New Bus Service 51
Special Army Truck 52
The Gasoline Vehicle 53
Municipal Service Extensions—Vehicles in Europe 54
Selling Commercial Vehicles on Credit—Part II 58
New Commercial Vehicle Models 60
  Pathfinder Truck 60
  New Marmon Truck 61
  Universal Ton Truck 62
  Stewart Ton Truck 63
  The Coates Tri-Car 63
The Readers' Forum 64
Horsepower and Gear Ratio in Trucks—Part IV 66
Trade and Personal Miscellany 68

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Superintendent Wurster of the Orange Brewery of Orange, says:

Orange, N. J., Sept. 25, 1912.
Recording Speedometer Co.,
54 Clinton Street,
Newark, N. J.

Gentlemen:—In reply to your letter of the 25th inst., regarding the speedographs which you attached to our four motor trucks, "what satisfaction they are giving," beg to say that the same are working to our entire satisfaction. We are able to keep track of our drivers on their routes, tell how many stops are made and time of each stop, also how fast they run their trucks, and in fact the speedographs give us the same information as if we had one of our officials go along with the drivers on their routes.

We can recommend your speedographs to any one who may be in need of same or any one who may have a motor truck.

Yours very truly,
ORANGE BREWERY.
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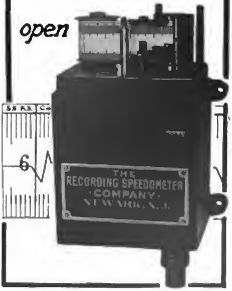

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L. Bamberger & Company, of Newark, N. J., purchased their first AUTOCAR from us in October, 1910, and now own NINE. This modern store got the right start in their delivery department by beginning their motor service with AUTOCARS. Their growth is the result of satisfactorily solving the problems of store equipment by installing modern appliances in all departments.

Modern Stores Must Have Modern Delivery Service

The "Dry Goods Economist" published an editorial some months ago regarding Modern Delivery Service, which merits reprinting:

"The demands of the shopper for extreme promptness in delivery service have frequently been the subject of harsh criticism, and yet the recognized necessity of pleasing the public has caused the most successful stores to more than answer this demand. To theorize about the unfairness of having to provide prompt delivery for distant customers is of no avail. The condition exists and THE MERCHANT MUST MEET IT."

The AUTOCAR COMPANY have sold cars to concerns in "every line of business," who not only are enabled to hold their customers by providing prompt delivery service, but have increased their delivery territory in many cases 100 per cent.

After a merchant realizes that in order to keep up to date he must adopt motor trucks, he turns his attention to the purchase of the car best suited to his purpose and pocketbook. We know of many instances where the merchant has paid too much or too little for his motor vehicle, either because he purchased a car too light in construction to withstand the daily delivery grind, or too large for the quick handling of his particular merchandise

The value of our trucks for delivery purposes is indorsed by over 700 individuals and corporations, who bear testimony that the AUTOCAR has been A GOOD INVESTMENT. The AUTOCAR is the recognized leader in the delivery field, built for economical service, and with lasting qualities to withstand hard daily use in all climates and all seasons.

The "right start" in motor transportation means YOUR business advancement. Begin your motor delivery service NOW with an AUTOCAR

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The COMMERCIAL VEHICLE

Vol. VII November, 1912 No. 11

Operating the Electric Vehicle; Cost Figures, Trips, Maintenance

A General Survey of the Progress of the Electric Vehicle, and Present Conditions Surrounding Its Operation in the Big Cities of America

OWNERS are becoming convinced of the superior economy in comparison with the horse vehicle; central station interests have been alert; batteries are greatly improved; cost is being reduced and actual figures of operation and maintenance accumulated.

ELECTRIC commercial vehicles have made enormous progress in the large cities during the past year, **the increase in their numbers running as high as 35 per cent. in some of the cities** as compared with the previous year.

A large fraction of this increase is represented by repeat orders, and while the repeat-order business is the best recommendation for the adoption of the electric, there has been a great amount of new business cars sold in lots of one or two to a new customer.

New York has approximately 2,000 electric trucks and delivery wagons in use; Chicago boasts to-day of 400 commercial electrics of various capacities.

The present increase in the use of electrics this season is attributable to several causes.

1. **The electric owners who have been going through the experimental stages for 2, 3 and often 4 years have become satisfied of the ecenomy of electric delivery over horse delivery;** they have largely solved the problem of caring for the electric; they have solved the driver problem; they have established a fairly reliable system of keeping cost records; and, in a word, are ready to place repeat orders, which they have been doing.

2. **The central station interests have been more alert than ever before to the possibilities of greatly increased business by the development of the electric truck business.** These interests in the bigger cities have appointed special department heads to look into and develop this business. **In some cities, for example, Chicago, there has been a reduction of practically 25 per cent. in the cost of electric current for battery charging.** But the aggression has gone further from these central station interests: **They have in Boston developed the electric garage business; they have carried out co-operative advertising schemes;** and they have established clubs where every pro and con in the development of the electric commercial business has been gone into with satisfactory results.

3. **There has been much done in the field of battery improvement:** Battery cost has been high with many electric truck owners, due partly to neglect by the owner, due to rough streets, and due to inherent defects in the batteries. The last year or so has witnessed amazing battery activity. Some of the makers have shown exceptional activity in perfecting their product so that they now feel sufficiently confident to place a definite guarantee covering a period of years' use and also can give definite facts on cost of maintenance. This development has had a very salutary effect on the buyer and has increased his confidence in the electric vehicle.

4. **Tire cost is being slightly reduced although** it is excessively heavy in many cases. This is largely a local problem, being greatly dependent on the street pavement, the amount of overload carried, the driver and the tires themselves. Tire makers are active to-day, but there still remains very much for them to do.

Although much has been done in accumulating costs on electric vehicle operation in various fields there still remains a wide difference in the cost of delivery by firms located side by side in the same cities and

delivering over practically the same residential sections. This is well demonstrated in the case of two large department stores in a leading American city, both using electrics, one using more vehicles than the other. Both concerns have been keeping costs accurately, using much the same forms, so that the differences in cost are due to imperfections in operation and perhaps to differences in the performances of the vehicles, which are, however, of approximately the same load carrying ability. One of the stores has delivered packages at a cost of 10 cents each, the other 6 cents each. The period of estimation has extended over 6 months. Both vehicles were operating in house-to-house delivery, averaging from 100 to 150 packages per day with a mileage of 40 to 50 and sometimes as high as 75 in busy seasons.

These facts alone show that, while concerns are doing their level best to get accurate costs on delivery, which they did not do in the days of the horse and which they did very imperfectly in the early days of electric vehicle, there is still much to be done in this field. One firm is able to save nearly a cent a package in delivery by its improved methods of loading the packages at the store and properly arranging them in the delivery wagon. Another concern saves more than a cent per package over its rival in its system of boys who go with the vehicle and attend to the house-to-house delivery work. One concern has developed a wagon design that saves nearly $10 per day by facilitating as it does the handling of packages in loading and unloading.

Electric is Machine for House-to-House Delivery

During the past year it has been satisfactorily demonstrated to department stores that the 1500-pound electric and the 1-ton vehicle are well adapted for house-to-house delivery work and that they are quicker and cheaper than horses in this work. A year or so ago there was much questioning of this and it is true that when it was begun the method of controlling the jumper boys was anything but economical. To-day this is changed. Now an electric in house-to-house delivery will deliver 75 or 80 packages and only make 40 stops, which is made possible by a careful arrangement of the packages so that a jumper boy will average parcels for two deliveries for each stop of the vehicle. Instead of an electric in this house-to-house delivery going out with one jumper boy it is sent with two and sometimes three boys. The head of the delivery department has at last realized that loss of time is the great thing to fight in the operation of vehicles in house-to-house delivery. **He has learned that it is much more economical to put on an extra boy than it is to keep the vehicle standing idle along the street waiting for the boys to return from some distant house delivery.**

The more the firm operating electrics secures an accurate line on the cost of operation, the more enthusiastic is it for power delivery. With the accumulation of cost data there is a careful segregation of these data into various divisions so that to-day a firm operating ten, twenty or fifty electrics can tell you that its cost of operation is 8 cents per mile for a period of 6 months with this number of vehicles. They can go further and show that tires are responsible for one-ninth of this; batteries cause one-third; chassis and body repairs one-seventh; and current one-tenth. **The operator of electrics in house-to-house and other forms of delivery knows that it is possible with one electric to make from 100 to 150 deliveries per day and that in doing so distances average from 35 to 50 miles.** These people have also learned the value of crates in this delivery work to facilitate loading and unloading.

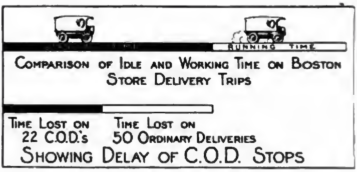


Chart Showing Relative Lengths of Standing and Idle Time in Boston Store Trip

Improvements Are Being Made in Loading Platforms

The improvement in loading platforms has been one of the commendable features of the last year, this being chiefly the case in larger cities. **Several firms operating fleets of thirty-five or fifty electrics have entirely revamped their delivery loading platforms, so that now they are as scientifically laid out as the interior of a model department store. With the loading platform is combined the charging plug so that the battery is given a short recharge while the load is being added.** This may be short, but it assists in the day's work. Those companies operating electrics in cold weather have learned the value of the warm garage in winter as an assistance in better battery charging and, consequently, greater mileage.

The Driver Has Been Educated Within the Year

The driver has been educated greatly within the past 12 months. He now realizes more than ever before that by careful observation he soon learns what streets are smooth and by selecting them can add many miles to the battery charge, can save the battery and the tires as well. The driver is also learning that the mute and silent battery is subject to the ills and weaknesses of man, and that although it does not complain it has its maladies, and must be attended to. The battery that goes into the garage at night in a completely exhausted condition and is taken out very early the following morning is very much like the driver who finishes an exhausting day's work late at night, and after a hurried dinner and short night's sleep is required to go out by 6 the following morning. He can endure this once or twice, but a continuation of such a practice would result in early destruction.

Breweries continue to be the big users of electrics and they also continue to lead it in the economic use of them. Many of the larger ones do all of their own current production from their own generators which are needed in the other departments of their business. They are enlarging their old remodelled horse stables and bringing them into the class of the modern garage. The battery room is better equipped and excellent cost systems have been installed. They have found great economy in space in garaging electrics as compared with stabling horses. In a word they are making good progress.

In order to show more fully and in detail just what individual concerns are doing in the progress of electrics in business delivery there follow examples of this work in New York and Chicago, in which cost figures and systems used are featured.

A Trip Made on Boston Store Electric

A representative of THE COMMERCIAL VEHICLE accompanied a delivery trip made by a 1500-pound electric wagon for the Boston Store, Chicago, on October 9, 1912. The vehicle used was of an old type, has been in use a year and is still in good condition. There was nothing to indicate that it was not as good as new. **The machine ordinarily accomplishes 40 to 45 miles a day, the trip named being unusually short. The two days before the trip had been unusually rainy, the roads were deep with mud and the pulling was hard.** This accounts for the truck's being pulled in at night. Ordinarily on heavy days the truck battery is boosted a bit at noon. Edison cells are used.

Two Boys and Driver Load the Vehicle

Loading started at 2:00 p.m. The day was misty and wet, so that the sorting was done in the car. Two boys assisted. One handed the package from the wheel box truck on the sidewalk to a second boy at the driver's seat, this boy passing the parcel back to the driver inside the body of the machine, calling out the address of the package as he handed it so that the driver could sort and arrange the packages to fit the route.

These bundles were arranged in the order of street numbers, each hundred number being placed in a separate place according to a system used by the driver every day. He thus could lay his hand on any package in the body at an instant's notice.

In delivering the boys would be given a package and would drop off and make the delivery while the truck went on to the next stop, the driver always telling the boys where he would pick them up. On C.O.D. parcels they were given change to an even dollar. If above $3 they were given change for a $5 bill. The money collected was returned immediately on the return of the boy. Reproduced is a tabulated result of the delivery trip made. In loading from the sidewalk 17 minutes was taken for each hand truck trip.

The load was on at 3:11 p.m.

Typical User of One Electric in Chicago

As an example of the small user of but one electric vehicle the store of A. Starr-Best, children's outfitters, is a good sample of satisfactory service. This conern uses a 1500-pound vehicle of neat appearance, electric driven. For the first 6 months the car averaged 38½ miles per day, allowing 6 days per week of work. The average cost per day with driver in uniform, etc., was $7.25. During the 6 months 11,000 stops were made or about seventy-five stops per day. The deliveries are all in house-to-house work. The truck makes 2 trips a day. Six thousand two hundred and thirty-eight miles were covered in the period mentioned. The machine is equipped with 60 Edison cells. The cost per package of delivery is about 10 1-3 cents. The batteries give about 55 miles per charge. The chief advantage of the use of the machine has been in reliability and as an advertisement. The cost as compared to horses is not known, as the firm never has used horse delivery.

Table Showing Actual Trip Made on an Electric Owned by the Boston Store, Chicago.

Stop	Delivery	Delay	Number of Packages
1	1	30 s.	1 package
2	2	1 m.	C.O.D. 1 package
3	3	1 m. 30 s.	C.O.D. 1 package
4	4	1 m.	C.O.D. 1 package
5	5	10 s.	Boy drops off 1 package
6	6	1 m.	1 package
7	7	2 m. 30 s.	C.O.D. 1 package
8	8	10 s.	2 packages
9	9	30 s.	1 package
10	ait for boy ..	4 m.	
..	11	No stop. Boy drops off 1 package	
11	12	....	1 package
	13	4 m.	2 packages
12	14		1 package
	15	Driver delivers 2 packages while boys are gone 16 m.	3 packages
	16		2 packages
.	17		1 package
.	18	....	Three C. O. D.'s
13	19	....	1 package
.	20	30 s.	1 package
14	21	....	C.O.D. 4 packages
.	22	5 m.	1 package
15	23	5 m.	1 package
16	24	....	2 packages
..	25	2 m.	1 package
17	26	....	1 package
..	27	....	1 package
..	28	1 m.	3 packages
18	29	2 m. 30 s	1 package
19	30	3 m.	C.O.D. 1 package (ref.)
20	31	1 m.	C.O.D. 1 package (ref.)
21	32		
..	33	....	1 package
..	34	10 s. (Boy drops off)	3 packages
22	..	7 m.	
23	35	3 m.	C.O.D. 1 package (ref.)
24	36	1 m.	1 package
25	37	4 m.	2 packages
26	38	5 m.	1 package
27	39	4 m.	C.O.D. 1 package (ref.)
	Start Return Trip		
28	40	3 m.	2 packages
29	41	....	1 package
.	42	....	2 packages
..	43	3 m.	1 package
30	44	....	1 package
	45	3 m.	1 package (ref.)
31	46	30 s.	C.O.D. 1 package
32	47	3 m.	C.O.D. 1 package (ref.
33	48	1 m.	C.O.D. 1 package (ref.)
34	Wait for boy ..	1 m.	
35	49	1 m.	C.O.D. 2 packages
36	50	4 m.	C.O.D. 1 package (wrong address)
37	51	1 m.	1 package
38	52	3 m.	C.O.D. 1 package (ref.)
39	53	4 m.	1 package
40	54	....	2 packages
..	55	5 m.	1 package
			72

Here current gave out on account of heavy roads and driver phoned for aid.

Miles travelled, 18.
Deliveries made (packages), 72.
Deliveries made (actual), 55.
Total stops made, 40.
Average delivery stop, 2 minutes 42 seconds.
Average stops per mile, 2.22.
Time on C. O. D.'s, 49 1-2 minutes.
Percentage of C. O. D.'s in number, 33 per cent.
Percentage of time lost on C. O. D.'s, 46.
Number packages returned, 13.
Percentage returned, 1.8.
Total standing time, 1 hour 48 minutes.
Total running time, 1 hour 7 minutes.
Average packages per stop, 1.8.
Average packages per mile, 4.
Approximate cost per package, 5 to 6 cents.

View of the Ward Bread Co. Plant, Chicago

Another View of the Ward Co.'s Electric Garage

In figuring the running costs the following items were taken into account: Depreciation, 25 per cent., uniforms for driver and boy, wages for driver and boy, interest on investment, insurance, garage, repairing, licenses, tire chains and accessories, current cost, tire cost.

The Ward Bread Co. is using 60 electric trucks. Many of these machines have been used for from 3 to 4 years and outside of the batteries, which need renewing every year, are reported as good as new.

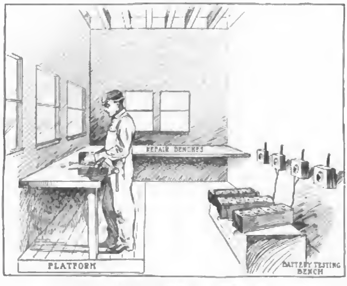
The arrangement of the plant for the accommodation and care of the vehicles is very satisfactory and complete.

The building was put up recently after experience in the use of electrics so that the arrangement is not a result of guesswork at what is needed but is laid out according to what experience has taught is necessary.

The drawing shows in plan the general layout of the part of the plant which is devoted to electric vehicles. The photographs give an idea of the appearance of the entire plant.

Trucks Back to Combined Loading and Charging Platform

At the La Salle street front of the building there are fourteen openings for the trucks. Backing into these on brick runways the truck comes to a combined loading and charging platform. As the vehicle backs the rear wheels hit a protecting step preventing the body jamming against the platform.



Front Corner of Ward Battery Repair Room

The loading and unloading is facilitated by the fact that almost the entire load is of crates.

Most of the machines complete their day's work in the middle of the afternoon and back in for charging. An inspection of the batteries is made, then charging is begun. The plugs are located just under the projecting edge of the delivery platform. Horse vehicles are loaded at a separate platform.

A Winter Garage is Part of the Equipment

On the far side is the winter garage. During the summer the vehicles are charged and largely cared for at the outside platform as they come in, but in the winter they must be charged in a warm place. If charged in the cold there is a loss of from 10 to 20 per cent. in the batteries even when charged to the same reading.

In the front corner is the battery repair room shown in the drawing. It is conveniently arranged with a workbench on two sides and a testing platform on the third. Above the testing bench are the charging plugs and meters for the work.

There are two such plants in Chicago operated by this company, one for the north and west side cars, this plant handling 35 vehicles, and the one described.

The vehicles leave for the first trips at 2 a.m. when there is little other traffic on the streets. Most of the deliveries are C.O.D. One driver on being questioned said that out of 40 stops made on the first trip that morning but six were charge accounts. The vehicles make from 40 to 45 miles per day, on an average, though a few on long runs are making nearly 60. Stops vary from 40 to 75. Each electric vehicle is doing the work of four horses. The firm has 55 horses in use as well but can only make 15 miles per day average with the best of them.

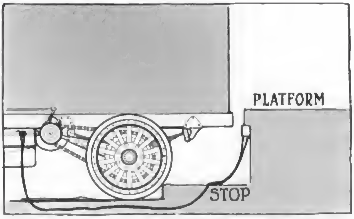
No Delays and No Breakages During Two Weeks Snow

During last winter when there was a very heavy fall of snow with two weeks of heavy running there were no delays and no breakages. Trucks pulled through on schedule and were much more reliable than the horses in the same work.

Tires on these vehicles last from nine months to a year.

One of the greatest items in the running of these wagons has been the advantage of good drivers. Drivers do much toward saving current as well. It costs the bread company but 20 cents per battery to charge. The current is generated in their own power plant of the bakery.

One driver interviewed covers a part of the business district in restaurant work, making two trips a day of about 2½ hours each. The first load leaves the plant at 2:15 a. m. and is off at 6:45. The machine then waits downtown for a big truck, which brings its second load at 8:45. This is off at about 10:30.



Combined Loading and Charging Platform at Ward Bread Plant, Chicago

Tremendous Saving of Cash in New York City

When the economy of motor driven vehicles over horse-drawn vehicles is known, and the proper operation and maintenance which makes this economy greatest is understood and observed, a tremendous saving of actual cash is the result. A striking example of this economy is shown by the figures giving the cost of operation of six General Vehicle electric trucks in use by M. Groh's Sons, New York City brewers. **This firm saves annually the sum of $610 on each one of these trucks which have displaced the entire horse-drawn equipment of the brewery; and besides this actual saving of money there is a saving of 5000 square feet of floor space which could be rented out for manufacturing purposes at a good figure, were it not for the fact that the firm is reserving this space for the enlargement of the brewing plant.** This space is in the form of two lofts, each 50 feet square, which are located above the former horse stable and were used for the storage of feed, harness, wagons and other material necessary to the maintenance of a horse delivery system.

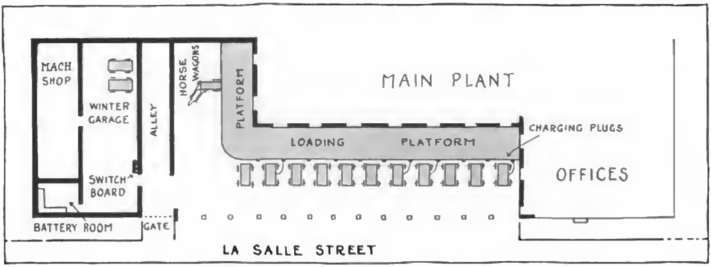
A Greater Sum Than $600 May be Saved

It may be that such a saving would not be possible in some other business house which might find it necessary to operate its commercial vehicles under different conditions, but there is absolutely no reason why such a saving or at least a saving of great size would not be possible even under more difficult conditions provided particular attention is paid to the economy of operation and maintenance of motor vehicles, which must be of a type most suitable to the special service. On the other hand, under better conditions, it may be that **it is not only possible to save a greater sum than $600 per annum, but that a greater sum than this is actually saved.** There is no doubt that the substitution of motor driven commercial vehicles for horse-drawn trucks results in the saving of many dollars annually, but the point is to make this economy as great as possible, and **in order to obtain this efficiency, all horse methods must be abandoned.**

The firm of M. Groh's Sons claims the distinction of being the first among the New York City brewing concerns to entirely do away with horse-drawn trucks and replace them with the more up-to-date commercial vehicles, the new apparatus displacing thirty-four horses. Needless to say, this firm is very enthusiastic over its horseless delivery service and the table of cost figures accompanying this article shows plainly that this enthusiasm is more than warranted.

Transformation of a Stable Into a Garage

A description of the garage in which this firm houses its electric vehicles is given in another part of this issue (see page 35), and it is necessary only to say here that it is a part of the former horse stable, the stalls having been torn out and other alterations made to adapt it to its new duties. **This transformation of the stable into a garage results in a large saving, and another saving that this concern is able**



Plan of Ward Bread Plant in Chicago for Accommodation of 60 Electric Trucks

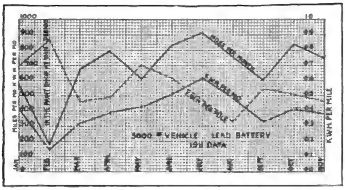


Chart Showing Cost of Operation of an Electric for a Year

to effect is in the generation of the power which is used for charging the storage batteries of the electric vehicles. In the brewing business a plant for the development of electrical energy is essential, and this firm did not find the installation of new generators necessary as there was sufficient spare current to charge the batteries of the trucks. There is, consequently, no charge made for the electrical energy consumed by the vehicles. The same power is used to light the garage and as this service was used when the garage was used as a horse stable there is no extra expense now the horse have been superseded by the electric vehicle.

As the area which is required for the storage of the trucks is less than that required for the stabling of the horses the taxes should be less, but this firm does not count them in figuring the expense of maintaining the vehicles, as the space which is left vacant is considered as being utilized, although not for the same purpose as it formerly was.

The rate of insurance is the same as it was when horses were used, but the firm considered that it is entitled to a lower rate as a consequence of its use of the motor driven delivery vehicles and is negotiating to obtain it.

Comparison of Horse and Electric Delivery Cost

A comparison of the cost of the horse delivery service and the electric delivery service follows:

Investment on horse drawn vehicles:—	
34 horses at $450	$15,300.00
8 wagons at $450	3,600.00
Harnesses	1,000.00
Total	$19,900.00
Expenses on horse drawn vehicles:—	
Interest on investment at 6 per cent	$1,194.00
Depreciation at 10 per cent	1,990.00
Stable wages	1,893.00
Harness repair	340.00
Veterinarian and shoeing	950.00
Feed	5,500.00
Wagon repair	500.00
Total	$12,367.00

These figures on the cost of maintenance of horse delivery are for a period of 1 year, covered partly by 1910 and 1911, and would probably be higher this year on account of the advance in the price of horse feed. **This firm considers that more than 10 per cent. should be figured for the cost depreciation on horses and wagons, but that 10 per cent. is enough for electric vehicles,** and, in order to give an ultra-conservative backing to the figures the percentage of depreciation was made equal.

The figures on the cost of maintenance of the electric vehicles, covering the period of 1 year, are given below:

Investment	$23,378.63
Interest on investment, 6 per cent	1,402.71
Depreciation at 10 per cent	2,337.86
Tires	1,700.00
Batteries renewed	2,400.00
Oil	70.00
Salary, garage man	884.00
Water, acid, etc	112.00
Total	$8,906.59

It is estimated that new tires have to be purchased every 14 months.

There is a difference between these two totals of $3,661 in favor of the electric vehicles, when the 59 cents in the total of the latter cost is not figured upon. The division of this difference by the number of electric commercial vehicles in service shows a saving of $610 in round figures for each truck.

The cost of maintaining and operating commercial motor vehicles in use as ambulances in hospital service is, of course, lower than in the outside world of business, owing to the nature of the work that the vehicles are called upon to do. Ambulance service is like fire department service in that the vehicles are in operation only when called out to perform some duty not regulated by time and often stand for long periods in the garage.

Two hospitals in New York City were called upon for these figures; the only ones that they were able to give did not include the cost of the current consumed or the items of depreciation and insurance. Both of these hospitals are controlled by the city, and consequently no record is kept of the cost of the current consumed by the vehicles, as it is furnished by an outside electrical company through one of the city departments. The hospitals are also free from taxation.

Cost Record of Electrics in Hospital Service

The only record of the cost of the vehicles that is kept is on miscellaneous repairs and the drivers' salaries, as is shown in the following tables:

Bellevue Hospital electric ambulance maintenance costs:—	
Miscellaneous repair parts	$64.48
Repairs to windshield	10.00
Driver's salary	300.00
Total	$374.48
Harlem Hospital electric ambulance and maintenance costs:—	
Miscellaneous repair parts	$20.21
Body repairs	8.50
Driver's salary	300.00
Total	$328.71

Both of these sets of figures are for the first 6 months of 1912.

As the driver does the washing and polishing of the vehicle and makes all minor repairs, there is no necessity for extra help.

Each of these hospitals has one electric ambulance at the present time, and several horse-drawn ambulances. It is the opinion of the doctors at both institutions, however, that it is but a question of time before the horse ambulances will be discarded and self-propelled vehicles substituted.

When one business man was requested to give cost figures on the operation and maintenance of his electric trucks he refused, giving as his reason that if he gave out the true figures no one would believe them because they were so low.

In assisting in cost keeping the Commonwealth Edison Co. has recommended a system which is in use by a large number of electric vehicle users. In its statements this company claims that an accurate keeping of costs and current consumption is necessary to a proper understanding of what a battery is doing, and necessary to its care. It therefore furnishes on request blanks, see table, on which a complete record of charging costs can be kept. The card shown is one that was filled out in actual service, showing the work of a truck running for a Chicago dry goods concern. The different columns indicate the meaning of the figures below on the chart when filled out, enabling the user to find out almost anything he wants to know about the current consumption and mileage.

By adding the total kilowatt hours per month and the mileage, and figuring the cost of current, one can quickly arrive at the cost of running this vehicle for the month in question.

Total kilowatt hours................206 + 20% for loss in rheostat = 247
Total mileage 551
Cost of current (with this customer)................3½c. per kilowatt hour
Cost for the month.. $9.65
Cost per mile $0.0175

If the truck in question had been running for a large user the cost would have been but $6.18, or $0.0112 per mile.

Graphic Method of Keeping Electric Costs

The second chart, page 10, shows a graphic curve method strongly recommended by the Commonwealth Edison Co. for showing at a glance all the conditions of service. The reading is self-explanatory. On the left are figures representing the miles per month and the kilowatt hours of current per month on the same scale. On the right the scale represents the kilowatt hours of current per mile. The dates are given on the lower or horizontal scale and show the operation of a vehicle from January to November.

Following the line of "miles per month," a great falling off is noticed in the month of February. Asking the reason, it is found that the car was in the paint shop during that month, hence its low mileage and low current consumption. At the same time the kilowatt hours per mile is high on account of the small mileage.

This is the actual record of a vehicle in service.

In May 610 miles were covered, but the kilowatt-hour consumption was high, about .7 per mile. This would bring about a consultation with the driver in ordinary circumstances, to see what had caused the loss. **The greatest mileage reached during the period for any month was in July, with some 600 kilowatt hours' consumption and about .0475 kilowatt hours per mile.**

R. H. Macy & Co. Keeps a Complete Record

R. H. Macy Company, the New York City department store firm, keeps a complete record of the cost of maintaining its 32 electric vehicles for each month and at the end of every 6 months a complete report is made, covering the various monthly expenditures. The record of the 18 Lansden vehicles is kept separate from that of the 14 General vehicles.

Table Showing Method of Keeping Cost of Operating Electric Vehicle

COMMONWEALTH EDISON COMPANY

CHICAGO, ILL.

Electric Vehicle Battery Record of .... *Dry Goods Delivery* ....
Address .... *Chicago, Illinois—June, 1912* ....
Make of Vehicle .... No. of Cells ....

Date	Start		Finish		Start	Finish	Kilo-Watt Hours	Gravity		Amp-Hour Meter		Miles Run	Mileage Indicator
	Time	Amp's	Time	Amp's	Watt Meter Reading	Watt Meter Reading		Start	Finish	Disch.	Charge		
1	10:00	34	12.45	10	5194	5202	8			60	0	20	564
2	10:00	34	1:20	10	5202	5211	9			76	0	26	590
3	10:00	34	12:40	10	5211	5218	7			60	0	21	611
4													
5	10:00	34	1:30	10	5218	5227	9			74	0	25	636
6	10:00	34	12:00	10	5227	5232	5			40	0	13	649
7													
8	10:00	34	1:10	10	5232	5241	9			68	0	24	673
9	10:00	34	1:15	10	5241	5249	8			72	0	25	698
10	10:00	34	1:00	10	5249	5257	8			64	0	22	720
11	10:00	34	1:10	10	5257	5266	9			74	0	24	744
12	10:00	34	1:30	10	5266	5276	10			80	0	27	771
13	10:00	34	12 30	10	5276	5283	7			56	0	20	791
14													
15	10:20	34	12:00	10	5283	5289	6			60	0	19	810
16	10:00	34	12.30	10	5289	5299	10			71	0	24	834
17	10:00	34	1:00	10	5299	5307	8			70	0	24	858
18	10:00	34	12:00	10	5307	5314	7			53	0	19	877
19	10:00	34	12:20	10	5314	5323	9			76	0	25	902
20	9:30	34	12:00	10	5323	5330	7			54	0	18	920
21													
22	10:00	34	11:30	10	5330	5336	6			52	0	19	939
23	10:00	34	12 15	10	5336	5345	9			74	0	24	963
24	10:00	34	11:30	10	5345	5354	9			74	0	25	988
25	10:00	34	12:00	10	5354	5362	8			70	0	24	1012
26	10:00	34	12:10	10	5362	5370	8			70	0	23	1035
27	9:00	34	11:15	10	5370	5376	6			48	0	16	1051
28													
29	10:00	34	1:20	10	5376	5386	10			78	0	26	1077
30	10.00	34	12:00	10	5386	5391	5			44	0	18	1095
31	10:00	34	12 30	10	5391	5400	9			56	0	20	1115
Total							206					571	551

Truck Exhibits at the New York Electrical

New York Show a Big Success, But There Might Have Been More Truck Exhibitors

THE Boston Electric Show and the New York Electrical Exposition have been pleasing to exhibitor and visitor alike.

Preliminary to an account of the two expositions the following facts relative to the electric truck industry is of interest: The total number of electric trucks in America at the present moment approximates 8,000. Figures indicating the number of trucks sold during the present year are not yet available. Last year 1911 data on hand indicate that about 1,000 electrics were sold.

In New York City there are now very close on 2,000 electrics; this figure being 25 per cent. of the total number in the whole country. Up to September 1, this year, the increase had been 45 per cent. over the previous year.

With regard to makers there are forty-eight manufacturers of electric trucks in the country. About ten of these came into existence during the past year.

The New York Electrical Exposition and Automobile Show, conducted under the auspices of the New York Electric Vehicle Association, and held at the Grand Central Palace, October 9-19, was larger and more complete than previous shows with regard to general electric apparatus.

From the viewpoint of the electric commercial vehicle dealer the Exposition was a great success. The management of the exhibition place the attendance figures at 150,000, an increase of 30,000 over 1911.

Many Actual Sales at the Show

In spite of the fact that the vehicle dealers consider an exposition of this kind chiefly from the advertising point of view, many actual sales are reported, one concern having sold ten trucks, another three and a third two. Some of the dealers declined to make any statement in regard to the number of sales and would only say that they had disposed of several. A large number of first-class prospects was secured by every exhibitor, one stating that he had made 60 appointments for demonstrations and another that he had hired three extra salesmen to take care of the new business.

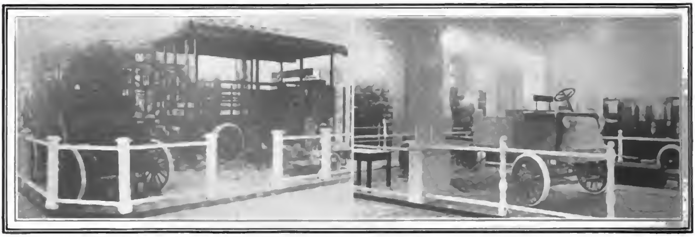
Exhibits of Lansden Co. at New York

Very few of the dealers had the power to appoint agencies.

The greatest part of the business done and the inquiries made were general and came from the larger firms, but some of the dealers reported interest shown by small firms and individuals at present using from one to four horses. Among these small firms were grocers, butchers, florists and laundries. Prominent among the larger customers who purchased and inquired about electric transportation were coal dealers, brewers, express companies, department stores and electric light companies.

In an exhibition of this kind it is to be expected that everyone is going to have his little kick and there were several of these of only individual importance. Two things were agreed upon, however, by a majority of the dealers present; these were that the buying power of the attendance was limited in too great a proportion to its size and that a far greater amount of business could have been done if the vehicles had been segregated, as no one who comes to look at trucks, and trucks alone, wants to wander along aisles lined with miscellaneous exhibits, vainly seeking to achieve the object for which he came.

Special attention was paid to the electric commercial vehicle exhibitors in the advertising of the exposition. During the last three days of the exhibition advertisements headed "Electric Transportation" were run in the newspapers and tickets to the exposition were offered to business people showing sufficient interest in the commercial vehicle department to write to the management.



General Vehicle and General Motors Exhibits at the New York Show

Exposition and the Boston Electric Show

The Model Electric Garage at Boston

It was felt that the Boston Electrical Exposition prevented many truck manufacturers from exhibiting in New York, as the two came at the same time and the Boston exposition lasted longer.

Truck Exhibitors at New York

The truck exhibitors and vehicles shown were as follows:

ANDERSON ELECTRIC CAR CO. Delivery wagon.

ATLANTIC VEHICLE CO. 2-ton chassis.

CLEVELAND-GALION MOTOR TRUCK CO. Model showing four-wheel drive and four-wheel steer.

GENERAL MOTORS TRUCK CO. Chassis of 5-ton truck.

GENERAL VEHICLE CO. 3½-ton truck, 1,000-pound delivery vehicle, and a 2,000-pound industrial truck.

BAKER MOTOR VEHICLE CO. Chassis of 2-ton truck and a general service wagon.

CHAMPION ELECTRIC VEHICLE CO. 1,000-pound wagon designed to take the place of the single horse-drawn delivery wagon, and the chassis of the 1-ton chain-driven truck.

LANSDEN CO. Four models of commercial cars showing 1,000-pound and 3,000-pound vehicles, and 2 and 5-ton trucks of the improved 1912 model; also combined sprinkler, flusher and road oil built for the city of New York and the first truck to be purchased by the Street Cleaning Department of that municipality.

STUDEBAKER CORPORATION. 5-ton brewery truck loaned by George Ehret, 1,000-pound delivery vehicle for retailers—one in a jeweler's service—and the 1913 2-ton truck.

WARD MOTOR VEHICLE CO. 1,000 and 2,000-pound trucks.

Electrics Have Conspicuous Place in Boston Show and Exhibitors Are Well Pleased With Results

With regard to the Boston Show—which closed on October 26, after a four weeks' run in Mechanics Building—first, it was a noticeable fact that nearly a score of manufacturers and dealers had space in the electric vehicle section and most of the leading battery manufacturers exhibited their product. The electrics had one of the most conspicuous places in the building. The exhibits were visited by thousands of people daily and the exhibitors all report good success in the way of sales and also in securing many prospects. The show attracted visitors from all over New England, special excursions being run every few days, and there was developed a vast amount of business and interest in electric carriages and trucks. Attendants at the spaces say that they were surprised time and again to find that men with whom they were talking were substantial merchants or manufacturers, who had come to the show purposely to investigate electric motor trucking.

A surprising number of enquiries were from New England merchants and manufacturers and also central station men. The nature of the enquiries has been mostly as to mileage per charge per battery and replacement cost.

As another result of the show a number of new dealers have been appointed by the truck companies among country central station men. The attendance was over 400,000 and its nature generally high class. Considerable advertising in the general press brought the show well before interested people, but no special effort was made to attract the buyer. Everyone seems enthusiastic for another show and this will doubtless be announced in the future.

Truck Exhibitors at Boston

Of the electric vehicle exhibitors, however, only about half showed trucks, these companies being as follows: Anderson, Atlantic Vehicle, S. R. Bailey, Baker, General Motors, General Vehicle, Lansden, Studebaker, Walker and Waverley.

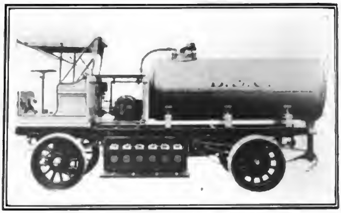
A model electric garage, shown by the Boston Electric Vehicle Club, which occupied one entire end of the basement, was an interesting exhibit.

Studebaker and Walker Vehicle Co.'s Exhibits at Boston Electric Show

Some Electric Models at the

Lansden 1913 Models

Most Important Changes—Adoption of Gear Drive and Side Loading and Unloading Batteries



Lansden Sprinkler Recently purchased by the City of New York

IN the design and construction of its 1913 electric vehicles, the Lansden Co., Newark, N. J., has made several changes, the most important being the adoption of the gear drive and the side loading and unloading of the batteries.

This company builds vehicles of five different load carrying capacities, as follows: 1000 pounds, 1-ton, 2-tons, 7000 pounds and 5-tons.

Body types are optional and are suited to the requirements of the purchaser.

The body space available in the five sizes is, eliminating the 1000-pound vehicle, respectively, 116 by 47 inches, 132 by 53 inches, 144 by 54 inches, and 159 by 60 inches. The wheelbase of the four larger models is 106 inches, 118 inches, 130 inches and 142 inches. The tread of the first two types is standard, 56 inches, this dimension increasing to 66 inches on the 2-ton, 69 inches on the 7000-pound, and 72 inches on the 5-ton.

Different Speeds in Various Models

The speed of the respective types is as follows: 14 miles per hour, 12 miles per hour, 10 miles per hour, 9 miles per hour and 8 miles per hour.

Battery equipment consists of a 60-cell battery for each vehicle, the types used being the A-4, A-6, A-8, A-10 and A-12. Each of the two smaller models has a mileage of 60 miles on a single charge under normal conditions, while the three other types can cover 50 miles on one charge.

In total approximate weight the different types range from 3000 to 10,000 pounds.

Of the latest continuous torque type the controller gives four speeds forward and two reverse. It is fully enclosed and is gear operated from a handle on the steering column at the left of the wheel.

An additional locking device prevents the unauthorized use of the vehicle.

The service and emergency brakes are pedal operated. The service brake pedal is arranged to return the controller to the off position when applied and to prevent the use of the controller until released. The service brake pedal is on the right of the steering post and the emergency brake pedal on the left.

Steering head and post, which is inclined, controller tube and brake pedals are carried by a single casting with bell shaped cap to give additional support and protect the controller operating mechanism.

The side loading battery cradle is made of steel channels and angles, reinforced and cross braced where necessary, and suspended from the frame members by steel brackets, hot riveted to the frame. Doors are hinged to the bottom members of the cradle openings, which, when lowered, form shelves upon which the batteries may be drawn out for examination. Battery trays are mounted on wooden rolling platforms, the cradle bottom and doors carrying channels in which the rollers travel.

The jack-shaft is of the fully enclosed type with bevel differential and bevel gear and pinion drive.

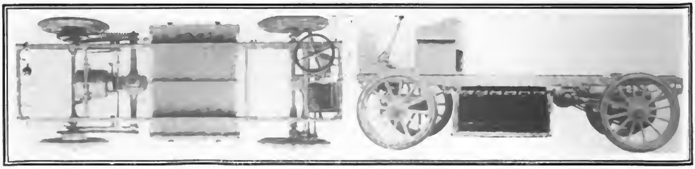
The bevel pinion is mounted on the motor shaft. Timken roller bearings are used throughout.

Alignment of Jack Shaft and Motor Frame

By means of a casting containing stuffing box, brake and differential, the jack-shaft casings and motor frame are held in alignment, and with the jack-shaft casings hung from side from members and the motor hung from a cross member, a three-point suspension is produced. Nickel steel heat treated shafts are used and the gears run in oil.

The motor is series wound and fully enclosed. It has an overload capacity of 300 per cent. for 30 minutes. Hess-Bright ball bearings are supplied.

Side chains transmit the power to the rear wheels and the sprockets on which they run are of heavy design.



Top and Side View of New Lansden Chassis, Showing Gear Drive and Battery Box Open

ew York Electrical Exposition

New Baker 500-Pound General Service Runabout, with Panel Body

Two New Champions

One Shaft Driven of 750-1000 Pound Capacity; the Other Shaft or Chain Driven of 1-Ton Capacity

TWO models were exhibited at the recent New York Electrical Exposition by the Champion Electric Vehicle Co., New York City. One, the 750-1000-pound capacity vehicle, fitted with shaft drive, and the other, the 1-ton truck, is built with either shaft or chain drive.

The speed of both models, 12 miles per hour, is the same. Battery capacity of the lighter model is approximately 50 miles over city streets, while from 40 to 60 miles may be obtained from a single charge of the 1-ton truck. The battery is carried either under the seat or under the frame of the vehicle, depending upon the desire of the customer.

In the first, the length of the body back of the seat is 5 feet 6 inches, and its width is 3 feet 6 inches. The 1-ton car has a body length of 7 feet 8 inches, measured from the back of the seat, and a width of 42 inches. The type of body is optional with the customer.

The wheelbase of the smaller model is 80 inches and the tread 56 inches. The tread is the same in the 2000-pound vehicle, but the wheelbase is 100 inches.

The overall length and width of the light wagon are 122 inches and 66 inches respectively, while the overall length of the truck is 142 inches.

When fitted with an express body, the total weight of the small model is 2150 pounds, and the chassis and battery of the larger model have a total weight of 3000 pounds.

Two Types of Motors Are Used

A Diehl 36-volt, 35-ampere motor fitted with Hess-Bright bearings propels the smaller vehicle and the prime mover in the 1-ton truck is a General Electric motor, also equipped with Hess-Bright bearings.

In the 750-pound wagon the direct shaft drive to the rear axle is used, the first reduction being by bevel gear and the second by spur gears.

Baker Service Vehicle

Runabout for General Service, 500 Pounds Capacity With a Maximum Speed of 20 Miles Per Hour

THE Baker Motor Vehicle Co., Cleveland, has added a general service runabout of 500 pounds capacity to its line of electric commercial vehicles. This little vehicle, which is fitted with bevel gear shaft drive and pneumatic tires, has a maximum speed of 20 miles per hour. It has a battery capacity of from 60 to 100 miles on a single charge.

In general appearance the new vehicle is much like a gasoline vehicle, having a hood with similar lines and fitted with doors to the cab which is enclosed by a windshield and a top with side curtains.

Open and panel bodies compose the standard body line. The open body is square and has a loading space 30 by 30 inches, while the panel body, which is fitted with rear doors, has a loading space 32 inches long and 36 inches wide, measured at seat level. The wheel base is 80 inches.

The Purchaser Has Choice of Two Batteries

Two types of batteries are specified, 30 cells 11 P. V. Hycap Exide or 30 cells 9 P. V. Ironclad Exide.

The motor is of the same design and construction as those used in larger vehicles manufactured by this company and is built in accordance with the size, capacity and speed of the car.

Diamond Silvertown Cord tires are specified, the size being 32 by 3½ inches.

The equipment consists of a windshield, trip odometer, two headlights, tail light, Sangamo ampere hour meter and a complete outfit of tools.

This type of car has proven very popular with electric light and power companies as well as merchants in divers other lines of business. It successfully meets the demand for a high speed, small capacity vehicle.

Champion, 750-Pound Vehicle, with Battery Carried Under the Seat

Electric Clans

The Third Annual Convention of the

BOSTON.—On October 8 and 9, at the Paul Revere Hall, Mechanics Building, Boston, Mass., was held the Third Annual Convention of the Electric Vehicle Association of America. At the convention more than 150 members were present.

The Electric Vehicle Association has done and is doing a great deal toward the furtherment of the use of the electric truck in delivery and transportation work in this country and the proceedings of the Association ought to be viewed with interest by all users of electrically driven machines.

The Association at the present moment has a total membership of 337 members, as compared with 197 on October 10, 1911. Of these, 83 are active members, and 222 associate members. The membership includes electric vehicle manufacturers, central stations and accessory manufacturers. There are two active branches of the Association, a New England branch and a Chicago branch.

Aims of the Association

It is hoped that in the near future a permanent secretary will be engaged and that an official organ of the Association will be under his editorship and management. It is aimed to include in the membership of the Association electric vehicle operators, and it is toward them that the Association hopes to direct an educational influence by means of the organ in question. The settlement of these suggestions is being left to the incoming administration of the Association.

The Association has now adopted an emblem, which will be used on lapel buttons at conventions and also on the Association letter-heads.

With regard to lessening insurance rates, the Association has done valuable work and has secured from the companies writing liability insurance a differential of 10 per cent. in the rates for the United States and Canada on all electric commercial vehicles and a reduction in the fire insurance rates on all electric vehicles, both commercial and pleasure, of 25 cents per hundred of insurance, as well as amassing a quantity of valuable data on the subject of insurance.

The Association is considering the establishment of courses

President's

TWO years of activity crowned with success proves conclusively that the formation of the Electric Vehicle Association of America was a wise move. Lukewarm manufacturers have been turned into enthusiastic boosters for the association; conservative central station managers now fully appreciate the value of co-operative effort in introducing electric vehicles.

While numerically, in comparison with some other societies, we can hardly boast, our present membership of 337 nevertheless indicates a growth in the past year of 70 per cent. and these 337 members represent companies having a combined capital account of over $500,000,000.

The object of the association is to promote the adoption and use of electric vehicles. A few years ago electric vehicles were not largely used and the public was unacquainted with their true worth. The vehicle manufacturers were not making large sales and their factory and selling costs were necessarily high. As few electric vehicles were being marketed, the battery manufacturers were making correspondingly few batteries. Central stations with comparatively high rates for electric current were hindering rather than helping the introduction of electric vehicles. All of these interests awoke at about the same time, joined hands and formed this association, with the result that the use of the electric vehicle has increased marvelously and its adoption is becoming more and more general.

It is gratifying to note that this co-operative effort has brought about larger sales of electric vehicles with corresponding reduction in overhead charges at the manufacturing plants. Central station managers have very generally recognized the strength of the argument that by using electric trucks themselves they set a good example for prospective customers to follow. Reductions in electric rates have almost invariably followed where central stations have made studies of this new load of charging electric vehicle batteries. The central stations have not failed to recognize the valuable feature of this off-peak business and their ability to take on this new load without adding to their capital accounts.

That the public is the ultimate gainer from the use of electric vehicles is now fully realized—the results of operation prove it. The progressive merchant, brewer, packer, express company, and others, are placing their orders not only for single wagons, but for dozens, scores, and in fact for entire fleets.

It is proper to call attention to a comparison between the price of gasoline and of electricity. Only a few years ago gasoline was a by-product which could hardly be disposed of. When the automobile industry started 10 cents a gallon was a ruling price. This price has constantly climbed to 14, 16, 18 and 20 cents, and even to as high as 25 cents in some localities. Only 2 weeks ago there was a meeting in New York at which the garage owners talked of rais-

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Summary of the Principal Papers Read at the Third Annual

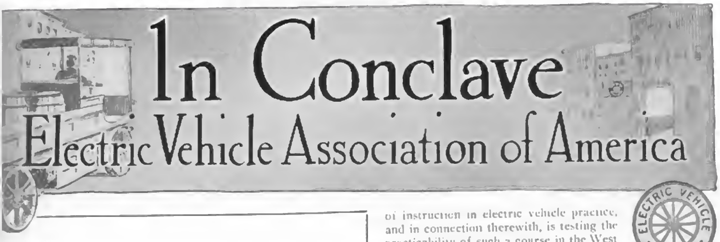
Cost Figures—Pender and Thomson

THE notes embodied in this paper are data supplementary to the data obtained by the electrical engineering department of the Massachusetts Institute of Technology and which was summarized in the July issue of THE COMMERCIAL VEHICLE. The authors also present some of the more important factors bearing on the use and cost of operation of motor trucks.

It is a difficult problem to estimate what will be the cost of operation of a motor truck under any given set of conditions. If estimates are based on 4 or 5 years of experience, items generally come too high owing to changes in construction and consequent reduction of cost; also, each succeeding year one gains experience and is able to operate the truck at lower expense. On the other hand, if only a year or two's records are at the back of the estimate the figures will undoubtedly be low unless special items are allowed for such as tire renewal, repairing of parts, painting, overhaul, etc.

The character of the service, and also physical conditions, have a distinct influence on truck life. In addition, one must consider the number of trucks on which cost data are averaged, age of trucks at the time of the report, length of time covered by the report, and the average number of miles traveled by each truck and the days each truck was used.

In the matter of tires, manufacturers' guarantees are generally based on stated maximum speed and stated load, together with a provision for the abuse of tires. The owner, however, cannot check the latter as he is unable to tell whether the driver abuses his tires or not, conse-



In Conclave
Electric Vehicle Association of America

ddress

ing the price to 30 cents a gallon. The garage owners are probably justified in proposing this rise, for the wholesale price is being constantly advanced, and the ultimate consumer, as usual, will pay the bill. On the other hand, the rates charged for electricity are constantly on the decline. The price of electricity used for charging the batteries in the first electric vehicles was at a rate of 20 cents per kilowatt-hour; a 15-cent rate soon followed, and for a number of years a rate of 10 cents or thereabouts was common. To-day the user who charges his own single vehicle gets rates varying from 9 or 8 cents down to 5 or 4 cents per kilowatt-hour, while the larger user, in certain localities, pays between 2 and 3 cents. The entire tendency is downward.

The owner of the electric vehicle has no fear of the dreaded hoof and mouth disease, or of the new horse disease which has broken out with such violence in Kansas, where it has caused the death of 16,000 horses, or a property loss of over $3 000 000. It is estimated that in New York State there are about 600 000 horses. What if this disease should get a fast hold there? A loss of 10 per cent of the total number of horses, which is entirely within the limit of possibility, would carry with it a monetary loss of at least $12,000 000, to say nothing of the suffering to the animals themselves and the inconvenience and the collateral losses to the owners.

Some day, I predict that all the dray horses in the large cities will be replaced by motor trucks. It would not be surprising if horses were legislated from the streets in the congested district within the next 5 years. Already in many cities the withdrawal of horses is noticeable. In Chicago alone during the year ending last May the shrinkage in horses amounted to 15 per cent. A shrinkage at an increased rate is almost inevitable, for the congestion of traffic in our large cities is one of our serious municipal problems.

Operating statistics show that electric vehicles are in service more days in the year than any other transportation device.

We have been successful in raising nearly the whole amount which we have attempted to secure for general advertising purposes. This has been expended by the advertising and publicity committee and in a manner which has received favorable comments from the contributors, and to it they have directly attributed increased sales. I hope that this co-operative advertising scheme may be continued.

The membership shows an increase of 71 per cent.

The committee on standardization has secured the adoption of a standard charging plug.

During the past year the New England section of the association has been formed. This is an outgrowth of the old Electric Vehicle and Central Station Association, which furnished the idea and formed the nucleus of the Electric Vehicle Association of America. There was also formed, late in the spring, a Chicago Branch.

of instruction in electric vehicle practice, and in connection therewith, is testing the practicability of such a course in the West Technical High School of Cleveland, O.

The committee on standardization reports the registering of standards with regard to charging plug dimensions and suggests standardization of lamps and the energy consumption on cars.

The committee on rates and charging stations has been requested to recommend a uniform sign for garages throughout the country, indicating at a considerable distance that electric vehicle charging could be obtained. Eight out of the nine signs suggested are reproduced on pages 20, 21 and 22. Design No. 3 is being favorably considered and may be adopted if the electric flashing can be eliminated and something else substituted.

Special Committees of the Association

The meeting opened on October 8 with an address given by the president, W. H. Blood, Jr., reproduced in part herewith. This was followed by the reports of the following committees: publicity on national co-operative advertising campaign, papers, membership, emblem, insurance, establishment of courses of instruction in electric vehicle practice, standardization, Chicago section of the Association, New England section, operating records, rates and charging stations committees. Summaries of the most significant of these appear on page 20, and these will give the best idea of what work the Association is doing. The reports read will come up for future action at later sessions.

Following came the regular business of the meeting, including the election of officers. The latter are as follows: Arthur Williams, president; F. W. Smith, vice-president; Harvey Robinson, secretary, and Day Baker, treasurer. Elected members of the executive board were: William H. Blood, Jr., P. D. Wagoner, G. N. Kelley and E. S. Mansfield for 3 years, and W. G. Bee to fill an unexpired term of 1 year.

A complete list of the papers read at the convention appears in the report of the papers committee on page 22. The salient points from these are reproduced below.

nvention of the Electric Vehicle Association of America

quently the correct value of the guarantee cannot be obtained. Then, supposing, an estimate be made of the tire cost in relation to mileage 1 year and 9 months after the truck has been taken into service; the cost will only be the price of one set of tires if the tires have an average life of 1 year, whereas the mileage will be for 1 year and 9 months and will not be in correct proportion to the cost. Quoting from the report in question:

> By taking the average of a number of individual records extending over a period corresponding to the life of a single set of tires, including cases ranging from practically new tires at the time of the record to cases where the tires are practically worn out at the time of the record, the average figure will correspond to the case where the tires are half worn out.
>
> Consequently, by adding to this average figure half the cost of a new set of tires and dividing by the average number of miles run by each set, one can arrive at a closely approximate figure for the actual cost of the tires per mile.

Under the heading of repairs are included the general overhauling and painting of the truck, usually done once a year; battery renewals are not included. It is even harder to find the cost of this item than in the case of tires. There are the same drawbacks to obtaining a correct average figure and, in addition, the amount of repairs will depend upon the character of the service to be performed, the nature of the roads and climate, and the system of operating.

> The average cost of battery renewals throughout the life of a car, like the cost of repairs, can be arrived at from present operating records only by making due allowance for the time over which such records extend, and for a number of other items. As in the case of tires, a distinction should be made between battery renewals and the total cost of the battery elements over the life of the car. In other words, the relation between cost per mile for *renewing* the battery elements, the *total annual expense* of battery elements per mile (including the cost of these elements in the bat-

Table Showing Relation Between Cost and Service

This table is reproduced from the paper read before the convention by Messrs. Pender and Thomson relative to the cost of motor trucking.

	Tires	Repairs	Battery Renewals	Lubricants	Electricity or Gasoline	Garage Expense	Sundries	Driver and Helper	Amortization or Depreciation	Interest	Insurance	Administration and Taxes
(a) Character of work:												
Size and type of truck	x	x	x	x	x	x	x	x	x	x	x	x
Nature of loads	x	x	x		x		x	x	x		x	
Number of cars	x	x	x	x	x	x	x					x
Distance per day	x	x	x	x	x				x			
Number of stops per day		x	x	x	x				x			
Days in service	x	x	x	x	x	x		x				
(b) Roads and climate:												
Road surface	x	x	x		x				x			
Grades		x	x		x				x			
Other street traffic		x	x		x						x	
Climate	x		x	x	x		x					
(c) System of operating:												
Routing	Indirectly as this item affects distance											
Loading and unloading	Indirectly as this item affects distance											
Overloading	x	x	x	x	x			x	x			
Overspeeding	x	x	x	x	x			x	x			
Garage facilities		x	x		x	x	x		x		x	x
Care of cars	x	x	x	x	x			x	x			x

tery supplied with the car) and the quotient of the battery renewal account by the total mileage at any period in the life of the car, is similar to the relation between the three corresponding items in the case of tire renewals. In the case of lead batteries, the steps will be greater in number and less in magnitude, since the positive and negative plates of the battery do not in general wear out at the same time. In the case of the Edison battery, however, it is practically impossible as yet to determine from operating records what the average cost of renewals will be. The manufacturers now guarantee this battery for 4 years, and it may prove to have even a greater life.

Items Affecting Battery Renewals

Battery renewals depend not only upon the mileage, but also upon the time in service, upon the number of cycles of charge and discharge, and upon a number of other items affecting the average energy consumption per mile, such as the number of stops, road surface, grades, loads, speeds, the care taken of the car, etc.

The rates for electric current in various cities differ considerably, and in many cases there is a sliding scale of rates depending on the total kilowatt-hours taken. For comparative purposes the kilowatt-hours per car per mile taken by the various sizes of cars under various conditions is, therefore, of more value than the actual cost of the energy. The cost of electricity for any given rate can then be deduced directly from this figure.

The large variation in the watt-hours per car per mile for a given size of car is due to a number of factors, such as the battery equipment, the weight of the load, the nature of roads and grades, the number of stops per mile, kind of cars used, average speeds, and the care of the batteries.

Factors Affecting Gasoline Cost

With regard to the gasoline truck, the gasoline consumption is affected by much the same factors as those affecting the energy consumption of the electric truck; consequently, there is a large variation in the miles per gallon in the records made.

The cost of lubricants is often included in the garage charge, or in the case of gasoline vehicles in the gasoline charge.

Garages are sometimes privately owned, or sometimes the garage cost is the amount paid for hiring room in the garage. In only a few instances has it been found that the total cost of garage, including interest and depreciation, is charged against the car. Garage expense when a large fleet is used is, of course, much less per vehicle than when only a few trucks are in service.

The item of sundries is subject to great variations, mainly dependent on the class of service. In general, this account includes such special items as curtains, speedometer, etc., and such expenses as toll and ferry charges.

The wages of chauffeurs vary considerably, ranging from $2.25 per day to $3.25 per day for electrics, and from $2.50 per day to $4 per day for gasoline trucks. Helpers' wages range from $1 per day to $2.50 per day.

One of the most disputed points is the probable useful life of a truck. This effects the amortization or depreciation amount. Manufacturers generally claim for their product a life of 10 years. Conservative users figure a life from 3 to 6 years. The oldest electric truck from which figures have been obtained is 7 years, and the oldest gasoline is 5 years.

The method now commonly used for figuring the depreciation charge is to deduct from the first cost of the machine the cost of the tires, and also, in the case of an electric, the cost of the elements of the battery which are renewed from year to year, and to take as the annual depreciation charge the remainder divided by the assumed life of the car. For example, if the car complete costs $4,000, including $400 for tires and $400 for the battery elements, and is assumed to have a life of 10 years, the annual depreciation charge is (4000-800) /10 = $320.

When the depreciation account figured in this manner is carried on the books of the company as an expense item, the cost of the tires and battery elements for the new car must be charged to the operating expense of the old car.

The end of the useful life of a car is reached when the total annual cost of the car, including all charges, becomes greater than the total annual cost on a new car, plus the interest on the capital invested in the old car.

When figuring the interest, annual depreciation charges do not represent an actual expense.

When the depreciation charges are figured on the total first cost of the truck, the average interest charge throughout the life of a machine should be taken on only one-half the total investment, when the first cost includes tires and batteries. When these latter are not included the total annual interest charge should be taken as the full interest rate on the cost of one set of tires and battery elements for a period equal to their life plus interest for 1 year on half the amount of depreciation.

A very few companies charge against their trucks any cost of administration. The cost, of course, depends on the number of cars in service, garage facilities and method of organization. This item ranges from $45.00 to $85.00 per car per year in cases where more than 30 cars are maintained.

Insurance cost depends upon the companies and how many kinds of insurance are taken out. It may best be estimated by obtaining from the insurance companies quotation of rates.

The authors conclude this most valuable paper with the following:

It is practically impossible to predetermine what will be the total annual cost of operating a truck of a given rating without knowing what are the requirements of the service, the nature of the roads, and the general method of handling and caring for the cars. To illustrate the difficulties involved in making up such an estimate, a table has been prepared, showing the relation between the various items of expense and the character of the work to be done, the nature of the roads and climate, and the system of operation. The crosses in any column indicate the characteristics of the service, as listed in the left-hand side of the table, which affect each of the given expense items listed at the top. We wish to take this opportunity of calling the attention of all interested in the subject of motor trucking to the fact that the information being compiled by the Institute of Technology will be summarized and published from time to time, and that a copy of each of the bulletins will be sent gratis, upon request, to any one interested in motor trucking.

Electrics in America—E. S. Foljambe

THE progress of commercial vehicles has been very rapid, and this is principally due to the personal interest which business men have taken in their new means of transportation. Electric pleasure cars were the first in the field, but these were quickly followed by the commercial car. The following figures show the rapid growth of electric and gasoline trucks from 1908 to the present time:

Trucks in Use

1908	2,500
1909	3,200
1910	4,000
1911	14,000
1912	30,000

The production of commercial cars has now reached the stage where the number in use can be greatly extended in 1 year. Taking the above figures 30,000 commercial cars in use in 1912 as a basis, it is safe to estimate that the production of these vehicles will exceed 40,000 during next year, thus more than doubling in 1 year the total number of trucks in use.

It is probable that the number of electric trucks now in use is between 7,000 and 8,000. Figures with regard to this, however, are difficult to obtain.

A special point is the folly of comparing the electric with the gasoline truck. These two kinds of self-propelled vehicles should not be engaged in a civil war, but rather should be united in battling with the horse. It is the latter which is to be eliminated.

It is only lately that the growth of the electric vehicle has been so large. This fact is due to the present high valuation by electric makers of advertising. Also the vehicles have been considerably improved owing to the many changes in battery construction.

It has been shown repeatedly that the life of an electric is anywhere from two to two and one-half times that of a good draught horse in heavy service, and when money is saved into the bargain it is no wonder that the electric truck is coming into its own.

Qualities of the Electric

Trucks today are efficient, light in weight as compared to the early models, the battery range on a single charge has been greatly increased, so that instead of 25 or 30 miles as a maximum, some trucks often do 50 miles or more. The electric requires no attention when standing; it does not eat at the noon hour, nor during the slack period. It can be made useful in many ways besides mere ly hauling from one point to another. It can be worked overtime during the rush, and when on account of slippery streets or excessive heat, the horses fail, the truck can be relied upon. Electrics can be operated by almost any man of average intelligence, and most of them are now in the hands of old horse drivers. Electric trucks occupy but one quarter of the stable room required for their equivalent in horses and wagons, and can be kept in an office building or retail store without the nuisances connected with a stable. They can be driven onto wharves and within buildings, and garaged without increasing insurance rates, the rates on buildings used for garaging being only $0.73 for each $100 and $1.05 per $100 for the trucks. These figures are based on average conditions for ten machines. Charging can often be done from apparatus which must be operated during the night at a loss, as in refrigeration plants, breweries, etc. This current is supplied at a minimum cost. The electric has been branded as a slow-moving vehicle, but transportation engineers are now coming to the conclusion that the speeds of all commercial vehicles are too high, and that the speed of the electric, especially in the larger sizes, is fully as high, if not higher than is desirable, and there is a tendency among all makers to reduce. Those who have had experience know that excessive speed is one of the chief causes of failure of heavy trucks and the fact that the driver cannot race an electric is one of the strongest points in its favor.

Electrics in All Businesses

Electric vehicles are used in almost all kinds of business. One maker speaks of fifty-four kinds of business in which his vehicles alone are used. The largest users are breweries, department stores, express companies, grocers, wholesale drug houses, electric light and power companies, hospitals, etc.

Some good figures of electric performance are quoted. Peter Doelger, brewer, New York, shows that the cost of delivery per barrel has been reduced 27 per cent. over delivery by horse. This means a saving of $800 a year by each truck, or a total saving of over $30,000. The truck in the service of the Central Brewing Company, New York, has a record of less than $100 for repairs in a year.

The Edison Battery—H. H. Smith

THE E-type of Edison battery was produced in 1901, and some of these batteries, 8,000 of which were sold, are still doing their work. But the battery was withdrawn from the market when certain defects were ascertained, and in 1908 the present type was ready.

The active materials are nickel hydrate and iron oxide in the positive and negative electrodes, respectively, and the electrolyte is a 21 per cent. solution of potassium hydrate containing also a small amount of lithium hydrate. The nickel active material is loaded in very thin layers into perforated steel tubes. Between each two succeeding layers is a thinner layer of pure nickel insuring good electrical contact between the smallest particle of active material and the metallic container and grid. A small percentage of mercury oxide fulfils a similar office in the negative plate, where the material is packed in flat steel pockets. Seamless steel rings, clamped into the steel grid, strengthen the tubes of the positive plate.

The pockets containing the iron active material are loaded and placed into the interstices of the negative grids. A hydraulic pressure of many tons corrugates the surfaces of each pocket and crimps its edges into good mechanical and electrical contact with the ribs of the grid, at the same time pressing the material into a compact cake.

The plates are firmly mounted on connecting rods, to which the terminal posts are attached at right angles, and are slipped into sheet steel cans or containers. Suitable insulation is provided between adjacent plates and between plates and containers. The top of the cell, upon which is mounted a combination gas valve and filler opening, is put into place and the cell is complete. All seams are welded by the autogenous method so that it is impossible to take the cell apart without ruining the container.

All metallic parts of the cell are heavily nickel plated, electrolytically, and all tendency of the nickel to peel is avoided by annealing at red heat in an atmosphere of hydrogen.

The cells are finally coated with an alkali-resisting, insulating paint and are mounted in trays similarly coated. The tray consists of a wooden framework from which the cells are hung and held rigidly in place by means of individual pressed steel hangers and clamps.

The cell terminals are tapered steel posts and connections are made with these by means of steel lugs correspondingly tapered so as to insure perfect contact. These fit so snugly that a small screw jack must be used to break the connection.

There are two types of cell on the market, type A and type B. The former is intended for use in electric vehicles. Its positive plates have 30 tubes each in two horizontal rows, and its negative 24 pockets in three horizontal rows. Type B is used principally for gasoline car ignition and lighting. The positive plate has only one row of 15 tubes, and the negative, smaller pockets, numbering 16, in two rows. These two types are subdivided according to the numbers of positive plates to the cell. There are eight types, ranging from B2 to A12. The range of capacities is from 40 to 450 ampere hours. Each cell contains one more negative than positive plates, thus the A6 cell contains a total of 13 plates.

Voltage Under Discharge

At constant normal rate the voltage under discharge averages 1.20 volts, the discharge commencing at about 1.45 volts, dropping rapidly at the beginning and the end.

The present type of Edison battery has now been in use for close on 4 years, the period covered by the guarantee, and it is stated to have an absolutely clean slate. Based on actual experiences the battery has been guaranteed to be capable of delivering full rated capacity after 4 years of use, but some consumers are figuring depreciation on the basis of 5 and 6 years' life.

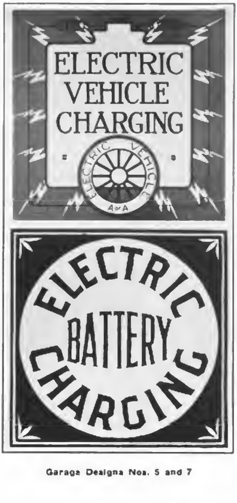
The Ideal Battery

The public is crying for a battery that may be charged in so short a time as to limit in no way any service that may be required of it. This ideal has not yet been obtained, but in certain fields it may be approximated by boosting at high rates, and the Edison battery is admirably adapted for this. This is because it will stand a comparatively high temperature, and further, because vigorous gassing cannot precipitate active material from the plates.

An Edison battery used in marine work was accidentally dropped into the sea and remained there for 4 days. After, the

Summary of Cost Reports for Electric Trucks from E. S. Foljambe's Paper

GENERAL:													
Rating	2,000 & 3,000 lb	3,000 lb.	3,000 lb.	3,000 lb.	4,000 lb.	4,000 lb.	4,000 lb.	5,000 lb.	2,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,500 lb.
Company	No. 15	No. 15	No. 15	No. 9	No. 49b	No. 50	No. 9	No. 4	No. 15	No. 79	No. 9	No. 9	No. 9
Business	El. Lt.	El. Lt.	El. Lt	El. Lt.	......	El. Lt.	El. Lt.	Glue	El. Lt.	El. Lt.	El. Lt.	El. Lt.	El. Lt.
Service	......	Meters	Lamps	Maint.	Miscel.	......	Maint.	Hauling	Lamps	Lamps	Instal.	Instal.	Maint.
Period of data	.10 mo.	20 mo.	26 mn	5 mo.	17 mn.	14 mn.	6 mo.	5 mo.	16 mo.	12 mo.	19 mo.	7 mo.	4.6 mo.
No. of trucks averaged	18	1	1	1	1	1	1	1	1	1	1	1	1
Truck—Cost	$2,500	......	......	$3,200	......	......	$4,630	$3,900	......	......	$2,441	$2,720	$1,000
Age	2-30 mo.	20 mn.	26 mo.	5 mo.	17 mo.	......	6 mn.	5 mo.	16 mo.	34 mo.	19 mo.	7 mo.	5 mo.
Company's number	......	18	15	94	......	44	93	......	37	2	67	89	95
Battery	Lead	Lead	Lead	Alkaline	Lead	Lead	Alkaline	Lead	Lead	Lead	Lead	Alkaline	Alkaline
PERFORMANCE—ANNUAL													
Miles	9,420	9,727	9,988	6,052	7,080	7,171	7,328	6,292	7,525	3,989	7,680	6,720	9,078
Kilowatt-hours	4,704	3,786	3,704	5,388	......	6,490	9,552	......	4,754	1,704	3,164	3,963	5,890
Days used	296	297	281	300	......	......	284	238	280	293	288	252	300
Days out of commission	......	15	37	......	......	......	......	......	28	23	......	......	......
Trips	......	......	......	......	......	......	......	399	......	......	......	......	......
Stops	......	......	......	......	......	......	......	......	......	......	......	......	......
Weight of loads	......		......	......	......	......	......	1,659,000 pound	......	......	......	......	......
EXPENSE—ANNUAL:													
Operation—													
Running repairs	$229.68	$229.68	$229.68	$295.80	$	V	$196.62	......	229.68	$37.06	$181.80	$38.28	$141.48
Lubricants				19.44		V	16.64	$4.40		3.50	16.56	15.72	19.32
Electricity	176.16	151.44	148.16	......	583.68	$129.80	......	112.81	190.16	85.20	......	......	......
Garage	111.96	111.96	111.96	316.80		......	271.24	120.00	111.96	307.50	301.56	281.16	296.80
Sundries	69.84	55.56	47.77	21.84		......	14.94	31.70	76.44	......	11.76	12.12	14.88
Driver	780.00	747.36	768.80	739.68	668.52	......	963.24	704.00	0.00	728.00	637.20	703.68	825.24
Maintenance—													
Battery	151.16	157.36	55.58	61.12	199.56	411.97	91.52	......	75.18	187.71	195.72	45.72	67.92
Tire	81.48	98.16	137.65	0.00	267.48	365.24	128.00	0.00	65.72	0.00	102.60	0.00	6.48
Overhaul		76.84	46.67		......			93.47	223.82				
Painting	159.84	44.63	23.81	0.00	......	365.75	80.00	......	0.00	113.60	86.04	0.00	0.00
Fixed Charges—													
Amortization	192.48	210.00	210.00	540.00	......	......	780.00	975.00	192.48	264.00	408.00	456.00	504.00
Administration	62.52	62.52	62.52	85.92	......	......	73.58	......	62.52	......	64.92	82.08	85.92
Interest	125.04	150.00	150.00	......	......	......	......	234.00	125.04	110.00	......	......	......
Insurance	12.50	15.00	15.00	......	......	......	......	152.00	12.50	182.56	......	......	......
Taxes	69.48	77.50	77.50		......	......	......	......	69.48	......	......	......	......
Company's total expense	$2,224.34	$2,208.01	$2,105.10	$2,080.80	$1,719.24	$1,272.76	$2,617.78	$2,427.40	$1,434.98	$2,019.13	$2,006.16	$1,634.76	$1,962.04



Garage Designs Nos. 5 and 7

electrolyte was analyzed, and in it was found a very large percentage of salt water. But the cells were simply rinsed out, refilled with standard electrolyte and put on test.

Lead Battery Developments—B. Ford

THE observation of the operation of many sets of batteries of the Ironclad-Exide type during the past 2 years has resulted in several improvements, both of minor and major importance to the lead type of battery. It is being demonstrated that the Ironclad construction is prolonging the life of positive plates to about three times that of the standard flat positive plate. Approximately 999 out of every 1,000 sets examined have required no renewal of the positive plate. This remarkable efficiency has necessitated improvements in other features of the battery.

Among these improvements is the pillar-strap connector or connecting-link, consisting of a pair of lead-coated copper sheets on the end of each of which is cast a lead alloy head for embracing, and burning to the pillar terminal. The connector of very low resistance is the result. The contact, however, between the copper and the alloy, although satisfactory at normal temperature, is sometimes poor when hot. A method was developed for integrally welding the copper and the alloy together. This has entirely corrected the trouble. The type of separator originally used in these batteries was a piece of vertical-grained, specially-treated wood. The life of the Ironclad-Exide battery is, however, about three times as long as the regular flat-plate battery, and the old style of separator proved inadequate. The wood split owing to the vertical grain. Consequently the wood was made with the grain horizontal. In addition, it was found that certain woods have a power of resisting the action of the electrolyte beyond others, and these woods are now used. The negative plates should now outlast the positive.

Another trouble was the formation of moss-growth often causing short-circuiting. Therefore, the top and bottom frames of the positive plates are encased in a rubber sheet which is vulcanized in position directly to the tubes of which the main body of the plate consists. The insulation is then complete. Another improvement is that the outside tubes of each positive plate are equipped with an unslotted rib of rubber to prevent breakage..

Status of the Electric—C. E. Michel

THE electric of today is a machinery unit designed and perfected to do a definite work, and it is no more a compromise than is a gasoline truck, freight hauling steam engine or transatlantic freighter. Its field of application is as exactly defined as is the field of each of these.

The question of mileage was one of the things that bothered the business man during the first days of the electric vehicle. At that time it was pessimistically considered that the storage battery had reached its maximum of capacity and efficiency; consequently, the electric vehicle was laughed at. Batteries now, however, have been very considerably modified and the question of mileage no longer exists.

Mr. Michel draws attention to the prosperous condition of the electric vehicle manufacturers of the present day and to the fact that while the old makers still remain with us new ones are constantly coming to the fore. The electric vehicle is the vehicle for the paved streets of the crowded city. Special attention should be focussed on this point. The makers are

Reports Read at the Annual Convention by the Various

THE work done by the various committees that have been formed by the Electric Vehicle Association of America is shown in the reports read before the members, and below we give the greater number of these. There is no need to emphasize the value of the results obtained; it is self-evident. The committees have done well, and will presumably do more, and their work should benefit the entire industry and all those connected with the transportation problem.

Reports of Membership and Emblem Committees

THE Association has at this date, September 1, a total membership of 317, as compared with 197 on October 10, 1911; a gain of approximately 60.9 per cent. The list is made up of 83 active members; 222 associate members; 7 auxiliary members; 5 press members. Among these are 17 electric vehicle manufacturers; 56 central stations; 10 accessory manufacturers.

The geographical location of the members shows 228 Atlantic Slope and Gulf States, including 9 electric vehicle manufacturers and 34 central stations; 72 Middle States, including 8 electric vehicle manufacturers and 13 central stations; 17 west of the Mississippi, including 9 central stations.

The Association now has two active branches—the New England Branch and the Chicago Branch.

The engagement of a permanent secretary was strongly recommended, and that one of the first of his duties be in the direction of establishing branches of the Electric Vehicle Association of America throughout the country. The secretary would undertake the general management and editing of an official organ whose pages would be devoted entirely to the subject of the electric vehicle, including the proceedings of all the branches of the Association. Such a publication could be made a great and valuable medium for stimulating interest and developing the electric vehicle business.

There has been since September 1, at which time the committee sent in its report, a total of twenty applications for membership, all of which are associates making a total membership of 337, or an increase of 71 per cent. for the year. Of these applications, fifteen are from the East, four are from the Middle West and one is from the Far West.

An Association Emblem has been selected by the Emblem Committee. It is now appearing on the Association letter-heads, and will appear on 500 lapel buttons for use at the convention.

Report of Committee on Insurance

THE Committee on Insurance reported that its efforts in collecting data as to experience with respect to accidents involving injuries to person and damage to the property of others in connection with the operation of electric trucks, also experience as to fire loss on same, have resulted in securing from the companies writing liability insurance a differential of 10 per cent. in the rates for the United States and Canada on all electrics.

There has also been secured a reduction in the fire insurance rates on all electric vehicles, both commercial and pleasure, of 25 cents per hundred of insurance. By eliminating the theft and valued policy feature from the fire insurance the differential is increased by 50 cents.

With respect to fire insurance on electric vehicles, these have for some time been receiving lower rates of premium. Prior to June, 1912, rates for the usual valued form of floater policy on automobiles has been as follows, for cars of the current year's model:

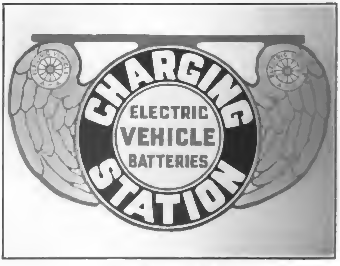
Gasoline Machines, 2½ per cent. to 2¾ per cent.
Electric Machines, 2 per cent.

For older models:

Gasoline Machines, 2½ per cent. to 4 per cent.
(according to list price of car and amount of insurance)
Electric Machines, 2 per cent.

For exclusion of the valued feature a discount of ¼ per cent. had been allowed on gasoline machines, and

For exclusion of valued feature and theft hazard, a discount of ½ per cent. The minimum, however, in any event was fixed at 2 per cent. This



Garage Design No. 2

not endeavoring to manufacture a field for the electric vehicle; there is no need, one already exists.

The interesting fact is brought out, according to an estimate made some years ago, that the trackless haulage of this country is sixteen times that of the track hauling. As the majority of the former is done in the city, it is considered that at least 80 per cent. can most suitably be handled by electrics. Mr. Michel quotes the following facts as conclusive evidence that where the electric is exploited business grows by leaps and bounds.

> St. Louis while a consistent market is not a leader, yet our revenue from charging during the first 6 months of 1912 increased at the rate of about $1000.00 per month, or nearly 37 per cent over the previous year. Another western city reports that the revenue from this source is now $67,000.00 per year, almost all of it being put on the lines in the last 4 years.
>
> It is estimated by Mr. Williams of the New York Edison Co. that the number of electrics in use in New York increased 35 per cent with the year ending June, 1912. Mr. Jones of the Commonwealth Edison Co., of Chicago, estimates that in June, 1912, there were 200 electric commercial vehicles under order and yet undelivered for Chicago business houses. One electric truck man, during the year 1911, sold single-handed, trucks to the value of $981,000.00, and he did not make an apology for a single one of them.

Traffic Conditions—R. McA. Lloyd

THIS paper draws attention to streets and traffic conditions as related to the electric vehicle. While roads have been partially bettered, a greater advance has been made in the construction of machines more able to cope with unfavorable conditions. The great thing is to secure co-operation among users in the matter of agitating the necessity for better city streets. The manufacturers have done their part, and it is now the turn of the highway commissioners. Belgian blocks should be eliminated, holes in asphalt filled up, proper rails used for trolley tracks and rails maintained flush with the street surface. It is suggested in this paper that the Association should take the matter up with kindred Associations and endeavor to concentrate engineering effort and public spirit on a movement for a higher standard in the construction and maintenance of city streets with a view to lowering the cost of transportation and consequently the cost of living.

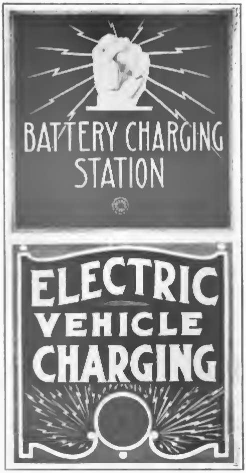
There Must Be Better Streets

It is far more important to have good streets for any kind of motor-driven vehicle than for horse-drawn wagons, and the advantage of changing from horses to other motive power will be greatly increased if at the same time better streets and more thorough maintenance can be secured.

From an engineering standpoint it is perfectly practicable to increase the average speed of electric wagons and trucks about 50 per cent., but Mr. Lloyd questions the advisability of so doing. Is it not wiser, he asks, to stick to the speeds now prevailing in the operation of electric trucks and advocate them for all methods of propulsion, not because electricity is inherently slower than gasoline, but because the interests of humanity are conserved in so doing?

He goes on to say that as it is very difficult to accomplish anything in the interest of public welfare by mere individual effort these suggestions are presented in the hope that the Association may find ways of opening up public interest in improved city streets and greater safeguards for the people who live and move in them.

There is no doubt that the question is a most important one from the standpoints of owners, drivers and pedestrians.



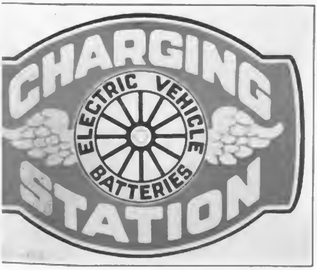
Garage Designs Nos. 4 and 3

mittees of the Electric Vehicle Association

m rate applied also to electric machines and therefore there was no
t for exclusion of the valued feature and theft hazard.
the above you will see that prior to June, 1912, there was a differ-
1 favor of electric machines of at least 25 cents, and this lower rate
l theft hazard and valued feature.
ne, 1912, the rate on electric machines was reduced to $1.75 for
, including the theft hazard and value feature, and a further reduc-
25 cents allowed for elimination of these two features. The fire
ce rates for electric automobiles is, therefore, now

For all models....................................$1.75
Non-valued, excluding theft form.............. 1.50

to June, 1912, there had not been a differential rate for liability
ce on electric commercial vihicles. In June, 1912, a 10 per cent.
tial rate was made for electric commercial vehicles, this differential
g to the entire country.
e re-classification of June, 1912, the only classes of commercial
upon which the rates were increased by the change in classification
follows: Barrel and box makers and dealers, boiler dealers and makers, building material merchants, carpenters, cleaners and dyers, coal dealers, contractors, feed and grain dealers, fire patrol and salvage corps automobiles, furniture moving, gas and water mains, ice cream dealers, junk and scrap iron dealers, laundries, lumber dealers and manufacturers, machinery dealers, mason materials, old distributing companies, piano movers and dealers, police patrol automobiles, railway iron, structural iron and steel.



Garage Design No. 1

Upon the following classes the rates remain the same: Ambulances, baggage transfer, bottlers, brewers, department stores, dry goods stores (retail), electric light companies (construction and repair cars), telephone and telegraph (construction and repair cars), street railway companies (construction and repair cars), express companies, liquor dealers, mail wagons, news companies, newspaper delivery, parcel delivery, safe movers and manufacturers, truckmen.

On all other classes of commercial trucks there was a reduction in rate on gasoline cars, and it will be noted that cars used by nearly all wholesale and retail stores and manufacturing plants would receive this reduction in rate. In addition, there is a further 10 per cent. differential on all electric commercial cars. This re-classification and the differential rate on electrics apply to the entire country.

Report of Committee on Instruction Courses

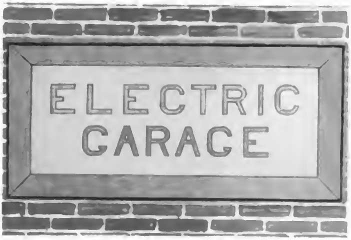
THE need of better trained and more dependable men for electric vehicle garage work as generally applied to the industry was responsible for the suggestion some months ago to the President of the Electric Vehicle Association of America, that this Association endeavor to find relief for that situation.

Practically all the men engaged in that work to-day have been educated in the school of experience, and while many have received technical training, most of them are without this advantage, and a great many lack the scientific and technical knowledge necessary in battery and motor work.

The committee appointed for the purpose of establishing courses of instruction in electric vehicle practice naturally turned its attention to the colleges. It was found that in many cases college men, after having completed high school and college courses, had spent so much time and money in preparing themselves for this work that they were not satisfied with the salaries to which this kind of work limited them even after three or four years' experience in practical garage work.

The committee's attention was attracted to the technical high schools now being established in several of the large cities. The subject was presented to the principals of the two technical high schools of Cleveland, Ohio, and, after careful consideration, the West Technical High School, of Cleveland, Ohio, undoubtedly the largest school of its kind in the United States, and one just recently completed, decided to establish a course in electric vehicle practice.

During this past summer one of the instructors in that school has been actively employed in one of the large electric automobile factories in Cleveland for the purpose of thoroughly familiarizing himself with the construction of electrics, and a special study has been made of repair and adjustment problems. He has learned how to diagnose ailments of electric vehicles and how to correct the same, a most important work in electric garages. It is the technical school's intention to have this man perfect himself by continued research in electric automobile and battery factories and depots.



Garage Design No. 8

The technical courses, like regular high school courses, begin after the students have passed through the primary schools. After completing the fundamental studies, the actual study of electric automobile work will begin and comprise a study of storage battery work, charging and discharging, and the repair and care of the batteries. The course in detail will consist of the following: Taking chassis apart and assembling, adjustment of different mechanical parts applying to both shaft and chain drive electrics; studying the differential, silent chain, etc.; detail study of motor unit, including motor control, etc.; wiring diagram of motor, control and entire car; detail study of the motor, field coils, commutator, brushes, etc.; proper operation of the car under varying conditions, as well as the locating and remedying of troubles.

It has been thought wise to begin and to test the practicability of this course in Cleveland, where there are several large electric automobile factories and a few important battery depots. Cleveland also possesses advantages in that electric automobiles are especially popular among its citizens, several thousand being in use, and, moreover, that city is centrally located; therefore, it is a good distributing point for young men trained in electric automobile work.

Report of Committee on Standardization

THE report of the committee on standardization states that with regard to the standardizaion of charging plug dimensions seven members have voted for the adoption of the same and only one against. A question has been raised with regard to the thickness of the shell, and it is advised that the shell should be made of high carbon steel or case hardened and the present thickness retained. The following companies have adopted the dimension of this plug as standard: The Adams Vehicle Co., Atlantic Vehicle Co., Automatic Transportation Co., Fullerton Electric Co., Baker Motor Vehicle Co., General Motors Truck Co., General Motor Vehicle Co., Rapid Motor Vehicle Co., Woods Motor Vehicle Co.. The Philadelphia Electric Co. has also standardized on this type. The committee is firmly convinced that eventually the type "H" plug and receptacle will be standardized all over the country.

The committee proposed that the Ediswan bayonet socket be adopted as a standard.

With regard to the energy consumption on cars, it was suggested that a maximum tractive effort or draw bar pull be standardized for a given size of tire, so that all vehicles would be on an equal basis with the given tire.

Report of Committee on Rates and Charging Stations

WITH the increasing number of electric vehicles in use, the question of properly caring for them becomes more and more important. Operators of very large fleets of traffic wagons can doubtless afford all the expert attention necessary in their private garages without having an influence on the economy of operation, but the operator of the single car, or of two or three cars, is more and more impressed with the necessity of having access to some large and well-equipped public garage where machines, and particularly batteries, can get the necessary expert attention at a reasonable cost. At least in some sections of the country, the private garage and charging outfit are becoming less popular, and the convenience and economy of the well-run public garage is making itself felt.

From the standpoint of the sellers of energy, it would at first thought seem to be the more desirable to have private garages with individual charging outfits, for under these conditions the load is spread very generally over the distributing network, and the energy is used in small amounts and at relatively high rates per kilowatt-hour. Analysis, however, raises a question of doubt as to these benefits. Public garage energy is taken in much greater quantities and with considerable concentration of distribution, and is sold at rates which are at least much lower than the rates made to the private garage, but inspection shows that the current is taken at a very good load factor and it is therefore probable that when load factor and quantity are taken into consideration, the business is more desirable and the price is better than in the case of the private garage. In addition to these features, machines kept in the public garages on the average give more satisfaction and are more continually in use.

The committee in its report last year made certain recommendations as to the maximum price to be charged for energy. A review of these recommendations at the end of a year leads to the conclusion that it is plenty high enough and should be, if anything, lower rather than higher.

The committee wishes to make another plea for the general practice in garages of making up the monthly total charge for keeping machines from several items, at least separating the charge for electricity from that for other service rendered, experience indicating that cars are used very differently by different persons and differently at different times of the year by the same person, and to attempt to make a single monthly charge which will cover the entire service for all classes of vehicles results in undercharging some people and overcharging others.

The committee has been requested to recommend a uniform sign for garages throughout the country which would indicate at a considerable distance the fact that electric vehicle charging might be obtained. It submits a number of designs, and will be glad to have some indication from the attendants at the convention as to which design meets with the most general approval. There is undoubtedly a growing necessity for these signs. Central stations in many parts of the country are making an effort to have charging stations established not only within their towns, but along the highways between important towns. A movement has recently been made in New York to have a chain of charging stations from New York City to Buffalo, and these pioneer movements will undoubtedly be followed by others.

Report of Committee on Papers

THE committee on papers submitted to the members of the Association in convention a report as to its work since the second Annual Convention held in New York City on October 10, 1911.

Seven monthly meetings were held during the year (November to May inclusive), at each of which one paper was presented and discussed. The subjects treated, the authors of same and the dates of presentation are indicated in the following table:

Is Central-Station Activity in the Electric-Vehicle Field Justified? by S. G. Thompson, November, 1911.
Has the Electric Vehicle Fully Arrived? by T. C. Martin and Kingsley G. Martin, December, 1911.
The Storage-Battery Car, by Herbert E. Pratt, January, 1912.
Standardization of the Electric Vehicle—Part II (Speed), by Alexander Churchward, February, 1912.
Efficient Charging of Electric Automobile Batteries, by J. F. Lincoln, March, 1912.
Electric Vehicle Installation of the Ward Bread Company, by Chas. A. Ward, April, 1912.
The Electric Passenger Vehicle, by Geo. H. Jones and R. Macrae, May, 1912.

All of these papers were illustrated with cuts, and with a majority lantern slides were shown.

The committee is advised that the average attendance at the monthly meetings was in the neighborhood of 150 members and guests. The presentation of most of the papers was followed by active and interesting discussion on the part of those in attendance, a full report of all the papers and discussions was printed in the official organ of the Association, *The Central Station*, thus giving rather a wide publicity to the papers and the discussion thereon.

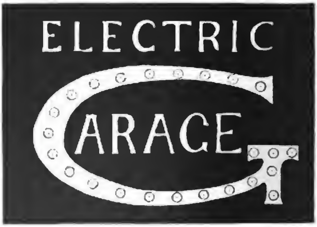
The committee suggested that the policy of treating but one subject at a given meeting, except under some special circumstances, should be adhered to, and that it be the aim of the incoming papers committee, so far as may be possible, to secure authors and assignment of subjects for at least 6 months in advance, and that all possible publicity be given these meetings and the subjects which are to be treated; that the papers be printed and distributed to the members and those interested sufficiently in advance of the meeting to awaken interest and bring out the widest possible discussion.

Since the formation of this Association the electric vehicle has "come into its own," and wider opportunities are now offered for the obtaining of papers and data; it is thought that this Association should be prominent in bringing these subjects before the public and those interested in the object to which the Association is devoted, namely: "To promote the adoption and use of the electric vehicle for business and pleasure purposes."

Papers Read at the Convention

THE following is a complete list of the papers read at the convention at Boston—summaries of the most important of which are to be found on previous pages:

Where We Stand To-day, by C. E. Michel, Union Electric Light & Power Co., St. Louis Mo.
Street and Traffic Conditions as Applied to the Use of Electric Vehicles, by R. McAllister Lloyd, International Motor Co., New York, N. Y.
The Publicity Campaign of the Electric Vehicle Association of America, by Frank W. Smith, United Electric Light & Power Co., New York, N. Y.
The West as a Field for Electric Vehicles, by Dr. M. Ekstromer, Denver Gas & Electric Light Co., Denver, Col.
Note on the Cost of Motor Trucks, by Dr. Harold Pender and H. F. Thomson, Massachusetts Institute of Technology.
Some Recent Development in the Lead Battery, by Bruce Ford, Electric Storage Battery Co., Philadelphia, Pa.
Electric Vehicle Development in the East, by Stephen G. Thompson, Public Service Electric Co., Newark, N. J.
Electric Vehicle Charging Apparatus, by R. E. Russell, General Electric Co., Schenectady, N. Y.
Progress of Commercial Cars in America, with Special Reference to the Electric, by E. S. Foljambe, *Commercial Car Journal*, Philadelphia, Pa.
Paper by Westinghouse Co.
Insurance from the Standpoint of Electric Vehicles, by Carl H. Clark, Field & Cowles, Insurance, Boston, Mass.
The Edison Storage Battery in Service, by H. H. Smith, Edison Storage Battery Co., Orange, N. J.
Electric Vehicle Service, by J. C. Ford, National Electric Lamp Association, Cleveland, Ohio.



Garage Design No. 9

Horse and Electric Delivery Compared

Comparison Made Only on Actual Running Time as Time Required For Delivery is Dependent on Factors not Entering Into the Question of Means of Delivery

TRIPS were made on two types of electric vehicles in the service of Gimbel Brothers, New York City, and on a horse-drawn vehicle distributing meat for the Harlem Packing House, New York City. One type of electric vehicle made 56 stops and delivered 209 packages, covering approximately 25 miles, in 9 hours; the other made 74 stops, and delivered 94 packages, covering approximately 35 miles, in 10 hours.

A COMPARISON of the time required for delivery by motor truck and by horse-drawn vehicles can be made only on the actual running time. Conditions being the same in both cases, the amount of time consumed in the delivery of a package by either method would be the same, as this depends upon three factors distinctly apart from either type of carrier. These three conditions are, first, the type of building in which the delivery is made; second, the nature of the goods and the delivery; and third, the driver or person that delivers the package and the person receiving it.

In order to ascertain the value of the electric vehicle in house-to-house delivery, three trips were taken on vehicles performing this service. Two of these trips were with electric vehicles distributing packages for Gimbel Brothers, the New York department store, and the other with a horse wagon giving a similar service for the Harlem Packing House, an uptown butchers' firm. Tabular forms, showing the number of stops each made, the reason for the stop and the time consumed are given.

The deliveries made by the department store vehicles were practically all in apartment houses where the person delivering the goods had to climb long flights of stairs with packages, which, although they might not have been collect deliveries, had, neverthless, to be delivered to the person or at the apartment of the person to whom they were consigned. If there were collect charges, more time was consumed. In a great many cases, if the package contained a waist or some other article of apparel, the delivery boy had to wait until it was tried on and examined, and in nearly every case the boy had to wait while the package was opened and the contents checked off.

Stops of Meat Truck Mostly Calls for Orders

On the other hand, the stops made by the butcher's truck on the first trip consisted mostly of calls for orders and were made very quickly, being all made at the ground floor. The three deliveries made were with collect charges and were also made at the ground floors of private houses. In only one case did the driver, who delivered the goods, have to wait while the customer opened the package and weighed the meat.

Two types of electric vehicles are used in house-to-house delivery by Gimbel Brothers, one is the light delivery vehicle used for distributing small parcels and known as the parcel wagon, and the other is a larger vehicle used for carrying heavier goods and known as a bulk truck.

Although the parcel vehicle arrived at the store at 7.30 on the morning of the day the records were taken, the loading was not begun until 9:41 and was finished at 10:12, the driver and his helper putting 206 packages on the truck. A large part of this idle time is necessary as the drivers are held responsible for the load they take out and none of them will start out with a short or an incorrect load. It would seem that a better arrangement of the aisles in the delivery department would save a great deal of this time, and there should be no scruples about putting on extra help if that is necessary.

The truck left the store as soon as the last package was in place and arrived at its first delivery point at 10:35, having traveled approximately 3 miles through heavy traffic.

During the trip the helper sometimes left the truck with deliveries while the truck went to another point and the driver made a delivery, which accounts for the apparently small amount of time required for some stops.

Frequent Sorting of the Load Was Necessary

As most of the packages were small and were disarranged by the motion of the vehicle, three stops were made to sort and rearrange the load and the last stop of the day was made in order to check up the cash and the deliveries while on the route so that if any errors were discovered they could be speedily remedied.

The vehicle left the last stop at 7:05 and arrived at the store, approximately 3 miles distant, at 7:25.

The bulk truck was at the store at 7 o'clock on the morning that the time records were taken, and it stood idle for 4 hours and 43 minutes, a tremendous, and it would seem an unreasonable loss of time. The delay was due to the same causes that delayed the package vehicle, and some part of it was necessary.

The loading was finished at 1:00, the driver and his helper putting on 109 pieces of miscellaneous bulk. As the load was put on the truck the driver wrote on a piece of card board the number of the house to which each package was

Horse-Wagon Trip in Meat Delivery

Stop	Calls	C. O. D.	Time of Stop	Time
1	1		:1	7:12
2	1		:0.5	7:15
3	1		:2	7:16
4	1		:2	7:20
5	1		:1.5	7:22.5
6	1		:1	7:26
7	1		:1	7:28
8		1	:2.5	7:31
9	1		:1	7:34.5
10	1		:1	7:38
11		1	:3.5	7:41
12		1	.5	7:45

Number of deliveries, 3.
Actual running time, 34 minutes.
Average time per stop, 1.6 minutes.
Total approximate mileage for the trip, 3 miles.

Record of a Day's Work of an Electric Package-Delivery Vehicle

Stop	Number of Packages	C O D	Calls	Time of Stop	Time	Stop	Number of Packages	C O D	Calls	Time of Stop	Time
1	8	5	1	7	10:35	29	1			.1 5	2:07 5
2	1	1		3	10:43	30	5	1		:3	2 11
3	3			5	10:46	31	2			:1	2 14 5
4	2	2		5	10 53	32	1	1		:6	2:16
5	3	1		0 5	10:58 5	33	2	1		:4	2 23 5
6	15	5	1	14	11 00	34	2			:30	2 28
7	Change			3	11 16	35	5	4		9	3 03
8	1			:0 5	11 20	36	6	4		11	3 14
9	1			:2.5	11.21 5	37	4			:0 5	3 25 5
10	Change			3	11 26 5	38	7	5	1	9	3 29
11	1			4	11 30	39	4	5		7	3·39
12	2	2		2 5	11 34 5	40				6	3 47
13	4			2	11:38	41	7	1		4	3 53
14	2	2	3	6	11 40 5	42	8		1	8	3·58
15	1	1	1	4 5	11 47 5	43	5			.7.5	4·07
16	6	3	1	16 5	11 52 5	44	1	1		0 5	4·16 5
17	4	2	2	5 5	12 13 5	45	10		3	·24.5	4 17 5
18	5	2	1	8 5	12 21 5	46	5	1		:1	4 44
19	1	1		0 5	12 31	47	6		1	.9	4 46
20	1	1		4	12 32	48	7	2		:14	4 56
21	1			0 5	12 40	49	1			5.5	5 10 5
22	Lunch			28	12 :50	50	4			11 5	5 16 5
23	12	9	1	22	1 ·00	51	1	2		12 5	5 17
24	4	5	1	18 5	1 31 5	52	12	1		·12 5	5 31 5
25			1	2 5	1.50 5	53	5	3		.1	5 45
26	8	4		4	1:53 5	54	4	4		:4 5	5 47.5
27	1			5	1 58	55	2	2		5	5 54
28	2	1		3	2.04	56				1 05	6:00
						Return Trip					7 25

The actual running time was 1 hour 31 minutes, the amount of time lost in traffic being 1 minute, 30 seconds.
The total number of packages delivered was 209.
The average time per stop was 8 minutes and 10 seconds.
The average time per stop, eliminating lunch time, was 7 minutes, 45 seconds.
The average length of time required to deliver one package eliminating lunch time, and two stops for change, was 7 minutes, 5 seconds.
The approximate mileage for the day was 26 miles.

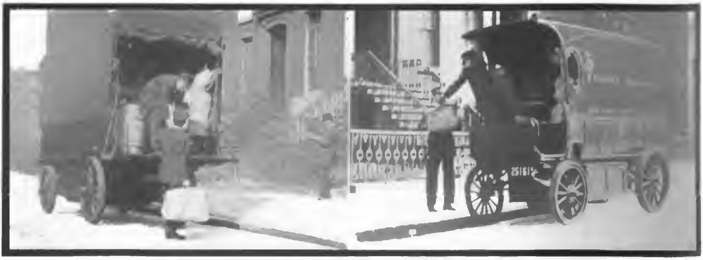
to go in squares divided according to the streets in his route in the order of delivery. As the load was of large pieces, sorting was necessary only once, and the card, checked off after each delivery, gave the location of the next stop.

When the loading operation was completed, the driver and his helper went to lunch from which they returned at 1:36, and the truck left at 1:36.5. The run to the first delivery point was through a region of heavy traffic, the truck arriving there at 1:50, having covered a distance of approximately 2 miles, losing 1 minute in traffic.

At stop number 17 the street was torn up and the driver and his helper had to carry two heavy bundles two blocks to their destination. Stop number 39 was to obtain an address and the load was sorted at stop number 41. The cash was checked up at stop number 62 and the load was arranged at stop number 73. Owing to the lateness of the hour few actual deliveries were possible after 6 p. m., most of the people being out.

The butcher's vehicle was a light jaunting cart, with a capacity of three hampers, containing about 260 pounds of meat. It was the first trip for the day and the horse was fresh so that he kept up a steady trot throughout the whole trip, covering approximately 3 miles in 34 minutes' running time, or at the rate of practically 6 miles per hour. As an electric vehicle is capable of almost twice the speed, a greater territory could have been covered in the same length of time.

A second trip of the horse delivery vehicle was made at 8:14.5 the same morning. At 8:27 the vehicle arrived at its delivery point, approximately half a mile distant, and as the driver was not familiar with the rules governing the receiving of packages at this point several minutes were lost before unloading was begun. The unloading required only three minutes, but the driver had to go into the basement and pull up an elevator by hand and load the hampers on it. Then, lowering them into the basement, he had to move them into the store room. As a result of these poor facilities, the vehicle



Methods of Delivery from Bulk Truck and Package Truck in the Service of Gimbel Brothers, New York City

Loading Bulk and Package Trucks at the Store of Gimbel Brothers, New York City

did not leave until 9:10 and reached the store at 9:19, having made a quick run. The total mileage of this trip was 1 mile, and the running time was 21.5 minutes. On the outgoing trip the vehicle was delayed somewhat by slow moving traffic.

In spite of the fact that the use of an electric vehicle would have materially reduced the actual running time, it would not be operating at its maximum economy on account of the large amount of lost time. If an electric vehicle were used on this trip or similar trips, where poor facilities cause loss of time, the driver should have the assistance of another man.

The driver stated that the horse would cover all of the trips scheduled for that day, but would be given a half day of rest on the day following. This would necessitate keeping two horses to cover this route, whereas one electric vehicle of suitable size and capacity would cover a larger territory every day and would be in service every day in the week. There would, of course, be several days during a year's service that the electric vehicle would be out of service for painting or repairs, but this would not make necessary more than one extra vehicle in a large installation, as when a truck is laid up for a day another vehicle can be hired to do its work, even in that case the use of electric vehicles would result more economically than horse-drawn wagons.

The Harlem Packing House has a fleet of six self-propelled vehicles in addition to its horse equipment, four of which have electricity for their motive power. Three of these electrics are used for city hauling of heavy goods and the fourth makes a suburban run covering 30 miles each day. Particular attention is paid to the early loading of the motor carriers, this operation being performed long before any of the horse trucks arrive at the shipping department.

Record of a Day's Trip Made With an Electric Bulk Truck

Stop	Number of Packages	C. O. D.	Time of Stop	Time	Stop	Number of Packages	C. O. D.	Time of Stop	Time
1	1		2	1:50	38	1		6	7:10
2	1	1	9	1:53	39			2.5	7:18
3	1	1	:2	2:05	40	1	1	1.5	7:22
4	1	1	:6.5	2:11.5	41	1		:16	7:24
5	1	1	:6	2:21	42	1		:1.5	7:40.5
6	1		:2	2:29.5	43	1		7	7:45
7	1		:3	2:34	44	Dinner		:30	8:00
8	1		:4	2:39	45	1	1	:3.5	8:31.5
9	1		:1.5	2:42.5	46	1	1	7.5	8:37.5
10	1		:2	2:46	47	1		20.5	9:12.5
11	3		:7	2:50	48	1	1	:5	9:34
12	1	1	:2	3:00	49	3		:6	9:40
13	1	1	10	3:05	50	2	2	5	9:49
14	1	1	:3	3:17	51	1	1	:8.5	9:55
15	2		:3.5	3:21.5	52	1		:7.5	10:05
16	1	1	2	3:26	53	1	1	15.5	10:14
17	2	1	14	3:30	54	1		:3	10:38
18	1	1	:9	3:48	55	1	1	11	10:46
19	1		:1	4:00	56	2		:9.5	11:01
20	1	1	12.5	4:03	57	2	1	18.5	11:11.5
21	1		4	4:17.5	58	1	1	3	11:35
22	3		8	4:32	59	1		5	11:40
23	1		8	4:49	60	1		5.5	11:46
24	1		10	5:01	61	2		10.5	11:53.5
25	1	1	2.5	5:12.5	62	2	2	16	12:05
26	1		:10.5	5:16.5	63	1		:2.5	12:24
27	2		:9	5:31	64	3	1	15.5	12:28.5
28	1	1	:5	5:45	65	1	1	2	12:45
29	1	1	:1	5:53	66	1		:6	12:49
30	1	1	:5	6:00	67	1		:9	12:56
31	1	1	:3.5	6:09.3	68	1		2	1:06
32	1		:11	6:18	69	2	2	:6	1:09
33	2		:5	6:30	70	3		:4.5	1:16.5
34	1	1	:8.5	6:37.5	71	1		10	1:23
35	1	1	2	6:51	72	2		5	1:36
36	3		.2	6:54	73	1	1	:7	1:49
37	1	1	:11	6:58	74	1		7	1:58

The actual running time was 4 hours, the amount of time lost in traffic being 5 minutes.
The total number of packages delivered was 94.
The average time per stop was 6 minutes 50 seconds.
The average time per stop, eliminating dinner time, was 6 minutes 20 seconds.
The average amount of time required to deliver one package was 5 minutes, dinner time and the time of a stop for an address being eliminated.
The approximate mileage for the day was 35 miles.

The Problem of the Second-Hand Truck

A Great Difference of Opinion Is Shown on the Subject; It Is Generally Considered, However, That This Problem Will Not Be So Serious as the Pleasure Car Problem, Owing to the Business Nature of the Truck

THE QUESTION

The following question with reference to the problem of the second-hand commercial vehicle was sent to all the leading motor truck dealers and manufacturers, both those of electric and gasoline vehicles, throughout the United States in order to ascertain the views of representative dealers in different sections of the country on a matter which is largely dependent on conditions of service:

What do you consider the present status of the second-hand truck problem? Is it going to be as serious as it has been in the pleasure car business in your city?

THE ANSWERS.

47 *replies received.*
23 *think the problem is not very serious.*
5 *have not yet encountered the problem.*
13 *think the situation will become as bad as that of the pleasure car problem.*
1 *blames salesmen's misrepresentation of trucks.*
2 *say there is a good market for second-hand trucks.*
1 *says there is not.*
2 *say principal second-hand trucks are rebuilt from pleasure cars.*

THE leading truck manufacturers and dealers differ greatly in opinion with regard to the second-hand truck problem, but the majority state that the problem is not as serious and never will be as serious as the second-hand pleasure car problem. Their reason for this view of the situation is that the truck is a strictly money-making proposition and an owner is going to use his vehicle until it is fit only for the junk heap. He is not influenced to purchase a new truck every season in order to keep in style as he is with the pleasure car, and the only time that he should have any reason to put an old truck on the market is when an overzealous salesman has sold him a vehicle that is unsuited to his particular needs.

It is presumable, too, that second-hand trucks will, in time to come, be almost entirely eliminated. That is to say, the education of the buyer will have been completed, and he will not buy rubbish. Also, being in a fit position to judge of truck capabilities and incapabilities, he will not, in order to be unwisely economical, prefer to try out the motor truck idea with an old truck. All his facts will be down on paper, with regard to his delivery service, his transportation problem, the growth of his business and a hundred and one other points. The truck will be tried out on paper, and paper will be the cheaper yet more efficient substitute of the second-hand truck. No man with a great big transportation problem before him will think of solving it by the second-hand truck; the service obtained from them would not be a true test, and he would be forever in the position of not knowing from practice the true relation of his means of delivery to the problem before him.

No Social Style to Be Maintained

There is no aristocrat in the truck field. There is no social style to be maintained, no neighbor to be outdone with regard to elegant form and finish; at least, except in a very small way, and more especially in the field of the electric, the latter vehicle generally delivering in smart districts, and so in part obliged to partake slightly of the snobbishness of outside appearance.

The second-hand truck is the product of the stupid buyer and the inexperienced salesman. Both of these clinging weeds that prevent the growth of the motor truck industry will eventually be cut away. And instead of the second-hand truck there will be a big junk heap where will rest the last remains of the efficient motor truck, worn down to its minimum vitality, dead after years of good service, and not discarded in its middle age.

Replies received by THE COMMERCIAL VEHICLE to the question given above are forty-seven in number, of which twenty-three dealers and manufacturers are of the opinion that the second-hand truck problem will never reach the proportions of the second-hand pleasure car problem, and thirteen feel that this situation is or will be as momentous as it is where pleasure cars are considered. There are five companies in this number that have not yet encountered the question of second-hand trucks and did not hazard any opinion on the subject. The vote is two to one against a good market for second-hand vehicles, while two say that the principal kind of second-hand trucks to be found on the market are those which have been rebuilt from pleasure cars. It is said by one that the problem will last as long as dealers and manufacturers, or their salesmen, misrepresent competing trucks. The detailed opinions follow:

Dealers Must Handle Second-Hand Trucks

BOSTON, MASS.—It is up to the dealers and the manufacturers to handle their second-hand trucks and keep them as they should be kept, and in this way there will not be a status of conditions in the truck business at any time like there is in the pleasure car business.—H. B. Pruden—Kissel Kar Co.—Kissel.

NEW YORK CITY.—We do not think there should be any problems connected with second-hand trucks. If sales are only made where the purchasers can use trucks to advantage, and if the trucks are as represented there is no reason why the purchaser should not use the truck so long as his business lasts. And the only time a truck should be offered for sale second-hand in our mind is when the owner goes out of business; and then it should be very easy to sell it to a man who would not be able to pay the price for a new truck.—Robert C. Reid—Harrolds Motor Car Co.—Pierce-Arrow.

PITTSBURGH, PA.—There is little or no market for second-hand trucks. This company refuses firms almost daily to make any allowance whatsoever on a second-hand truck.

The situation will hardly be as serious as in the pleasure car end. A business firm can afford to keep its old equipment as reserve and increase its equipment. The owner of a pleasure car seldom has use for more than one machine. The situation is entirely in the hands of the dealers in each district, therefore it rests with them whether they will create a fictitious market and take the large consequent losses or, by standing pat, allow the small loss to be absorbed by those responsible.—H. Howard—Packard Motor Car Co. of Pittsburgh—Packard.

CAMBRIDGE, MASS.—This proposition will take care of itself for a short time to come and then, in my mind, it will be worse than the pleasure car end, because the truck is a business proposition and people study it very carefully and the inferior trucks, which will represent a great percentage of the second-hand market, people won't buy at any price.—A. H. Harrington—Dodge Motor Vehicle Co.—Commercial and Pope-Hartford.

BOSTON, MASS.—In regard to the second-hand truck business, we hardly think it will be as serious as the second-hand pleasure car game has been. Undoubtedly there will be a number of these cars on the market all the time, but for some time to come they ought to be sold very easily.—Robert G. Howard—Bessemer Motor Truck Co.—Bessemer.

ST. LOUIS, MO.—We do not expect the second-hand truck to be as serious a problem as the second-hand pleasure car. There are fewer trucks and the proposition is business. However, there will be numbers on the market, as the new buyer buys on price, later discovering his mistake and desiring to trade in his unsatisfactory purchase.—S. S. Aull—Benoist & Aull—Commer.

CINCINNATI, O.—So long as the competitive dealers will trade in and misrepresent competing lines we will continue to be confronted with the second-hand pleasure car and truck problem.—M. A. Enders—Ford Motor Co.—Ford.

CLEVELAND, O.—The second-hand truck problem will never present the difficulty of the pleasure car. The truck will be used by the purchaser as long as it will run. The pleasure car is traded in every year or so because the owner grows tired of driving an old model. Also there will always be a ready market for a good used truck where pleasure cars of an old fashion design or appearance are unsalable.—W. C. Molin—Grabowsky Power Wagon Co.—Grabowsky.

As Yet No Problem Worthy of Notice

PHILADELPHIA, PA.—As far as the second-hand truck problem is considered there is no problem yet worthy of notice. The only second-hand trucks on the market are principally those converted from touring cars which were never worth a great deal and are not seriously harming legitimate truck business.—Fred. G. Bowing—Continental Motor Car Co.—Speedwell.

CHICAGO, ILL.—We have found that the second-hand truck problem is going to be as bad as the pleasure car in a very short time, in fact if not now. In several instances, we have had parties who wanted to trade in old motor trucks, some of which the manufacturers have discontinued making, and wanted very unreasonable prices for them, and a second-hand truck is not a very easy proposition to sell, even at a low price.—R. S. Mattoon—R. S. Mattoon Motor Co.—Indiana.

CLEVELAND, O.—The matter of second-hand trucks very seldom enters into consideration in our sales. There are very few second-hand electric trucks, and people who have gas trucks do not expect us to take them in trade against a new electric truck equipment. We are not anticipating that we will be required to take second-hand gas cars to any great extent, for as manufacturers of electric equipments we are naturally not in a position to handle second-hand gas cars.—E. J. Bartell—Baker Motor Vehicle Co.—Baker.

MILWAUKEE, WIS.—There are a good many trucks sold which are not giving the service they ought to and are not standing up. It will be very hard for a manufacturer, as they wish to trade in these trucks—A. E. Raffant—American Automobile Co.—Pierce-Arrow Co.

PITTSBURGH, PA.—At the present time the second-hand truck problem has given us no trouble and in only one case have we had the proposition made us of taking in a truck. However, we believe that in the future, if competition becomes as severe as it is in the pleasure car business, something of this kind may develop.—Julian B. Howe—Pittsburgh Auto Co.—Commercial.

CHICAGO, ILL.—The second-hand truck problem is a serious one—will be more so than the pleasure car. This will cause many failures and difficulties with dealers who do not have ample funds for carrying on their business, and this seems to be the general trouble with all motor vehicle dealers, whether they be dealers in trucks or pleasure cars. By all means trades in trucks should be eliminated. Why should a manufacturer buy another man's product, which is an extremely slow seller? Why should the man who wishes to eliminate a used truck ask a manufacturer to take it in exchange? He did not do it with horse vehicles in all instances, and it certainly was a smaller investment. It will necessitate the manufacturer absolutely opening branches in all cities if they make trades; dealers cannot afford to exchange. It will cause, as it has at the present time, cutting of prices on new trucks by an over allowance on the used. Something should be done immediately to avoid trades and the cutting of prices, or the truck business will be just the same as the pleasure car business.—M. H. Luce—Velie Motor Truck Co.—Velie.

Considers That the Problem Is Serious

NEW YORK CITY.—About 75 per cent. of the second-hand trucks that have been offered us in exchange, or that our salesmen found were on the market, would seem to be fit for nothing except consignment to the scrap pile. We think that the second-hand truck problem is going to be a serious one after a while, but not just at this time.—John H. Kennard—Couple Gear Co. of N. Y.—Couple Gear.

MINNEAPOLIS, MINN.—The second-hand truck problem has not bothered us to any extent as yet for the reason there is not enough of them on the market to cut any figure, but we do not believe it will ever be quite as serious a problem as the pleasure car for the reason that two-thirds of the pleasure cars that are disposed of as second-hand are sold because they are not up-to-date in style of body—not because the cars are worn out. With the truck this condition will not exist, for a truck will be run as long as it will give service regardless of its style.—A. E. Thompson—McArthur-Tollars-Thompson Co.—Veerac.

The Problem Will Not Become Serious

CHICAGO, ILL.—The second-hand truck problem in our opinion will never become serious. At present the second-hand pleasure car situation affects the sale of trucks, because worn-out pleasure car chassis can be purchased and equipped with commercial bodies at small cost. Generally speaking, this sort of a makeshift proves unsatisfactory and has a bad effect upon the legitimate commercial car business, but eventually this condition will not exist, and as there will be no such thing as yearly models in the commercial car business, and as a commercial car, as long as it will stand up and deliver the goods will be worth more to its owner than could be realized through its sale, we do not anticipate that the market will be flooded with second-hand trucks. It is a little different in the pleasure car business, as while the car may be perfectly serviceable, the average owner wants to have the new models as they come out, not from a point of service and efficiency, but on account of appearance.—W. A. Zimmerman—Mercury Mfg. Co.—Mercury.

PHILADELPHIA, PA.—We do not think that the problems of handling second-hand cars in the matter of trade are going to be as difficult as in the pleasure line.—P. Prouty—Autocar Service Co.—Autocar.

Chicago, Ill.—The second-hand truck problem has not been taken up by us as yet.—Francis L. Thomas—Franklin Auto Co.—Franklin.

Chicago, Ill.—It is the writer's opinion that there will never be many second-hand trucks, never enough to make a serious problem at all.—L. B. Garrison—Speedwell Motor Car Co.—Speedwell.

San Francisco, Cal.—We do not think the second-hand truck problem will be very serious. We have been doing quite a large truck business and have no second-hand trucks on hand.—H. F. Marsh—Standard Motor Car Co.—Federal and Kelly.

San Francisco, Cal.—The writer thinks lots of firms sooner or later will want to trade old trucks in for new ones, and expect big prices for the old trucks. The writer has sold about 125 trucks so far. We took in only one, and we sold it for the same money we paid for it, but it will be much different after a while when the trucks commence to get a little older.—Paul Kleiber—Kleiber & Co.—Gramm.

New York City.—We do not anticipate as serious second-hand truck problem as prevails in the pleasure car business to-day. We have found on one or two occasions in New York City local agents for certain trucks of a considerably lower price than the Alco have offered to take back in trade our trucks at practically a song. In each case the local agent has called us up and asked us to take the Alco trucks off his hands or else he would advertise second-hand Alco trucks for sale. Our attitude has been to stand pat. There is no necessity for the second-hand truck problem, inasmuch as there is not a prevailing year model as in pleasure cars and the element of style of course does not enter into the consideration of a purchase of a motor truck as it does in the purchase of a motor car.—L. A. Van Patten—American Locomotive Co.—Alco.

Chicago, Ill.—There are and will be second-hand trucks and delivery wagons which will have to be considered in making deals on new cars, and I believe it will be just as serious a problem as has been the case in the pleasure car field.—F. W. Arbogast—Studebaker Corp.—Studebaker.

Must Be Handled According to Circumstances

Minneapolis, Minn.—The second-hand truck problem, like second-hand automobiles and other second-hand goods, is with us and it will undoubtedly be here for all time to come. This is a matter for the different companies to handle in their own good way.—J. M. Oston—Avery Co.—Avery.

Chicago, Ill.—We do not consider the second-hand truck proposition at all serious as it is very seldom that we come in contact with this phase of the business.—F. E. Parker—Packard Motor Car Co.—Packard.

St. Louis, Mo.—The second-hand truck problem is not in any way serious in this locality at the present time. Of course it is inevitable, but we are convinced that it will effect the gas car business much more seriously than it will the electric—the reasons are obvious.—C. E. Michel—Union Electric Light & Power Co.—General Vehicle.

New York City.—Following a strongly defined selling policy, we do not accept trucks either in exchange or as part payment on a purchase.—J. Jaccard—J. Jaccard Co.—Aries.

Philadelphia, Pa.—In reference to the second-hand truck problem, I doubt if it will ever reach the magnitude of the pleasure cars. The second-hand problem does not affect the commercial cars as it does the pleasure cars. The man who owns a truck will invariably run it as long as it is possible to get any service out of it, and then it is cheaper to have it repaired than to try to sell it. We are not taking any trucks in exchange.—W. H. Metcalf—Woods Electric Garage.—Mais, Walker, Waverley, Detroit and Dayton.

Cincinnati, O.—The only second-hand truck problem that exists in our territory is the problem of second-hand electrics, the electrics not being very successful, due to local geographical conditions. There is no reason why the second-hand truck problem of gas trucks should ever be what it has been in the pleasure car business, where it is a matter of emulation, rather than real merit, of one model over another, that leads people to change so frequently.—T. A. DuBrul—Miller, DuBrul & Peters Mfg. Co.—Avery.

Chicago, Ill.—The present status of the second-hand truck problem is not severe, nor do we contemplate its becoming serious at any time in the future.—W. W. Bishop—Chicago Pneumatic Tool Co.—Little Giant.

Pittsburgh, Pa.—As far as the dealer is concerned, there is a vast difference between the pleasure and the commercial car. In selling high grade pleasure cars, it is a question of taking second-hand cars in trade, on 50 and 75 per cent. of the cars you sell, which is always a substantial loss to the dealer, regardless of the price at which they are taken in, while in selling the commercial cars it is a very rare occasion where it is necessary to take old trucks in trade for new ones.—C. V. Vestal—Vestal Motor Car Co.—Stevens-Duryea.

Just as Hard as the Pleasure Car Problem

Chicago, Ill.—On the subject of second-hand trucks, we see no reason to believe that the conditions will be any different on trucks than on pleasure cars, and it is only a question of time until this problem will be just as hard for us to solve as it seems to be at the present time on pleasure cars.—F. U. Stewart—Buick Motor Co.—Buick.

Philadelphia, Pa.—The second-hand problem in trucks will not become as serious as in pleasure cars because the average merchant if his truck is giving him good service does not care whether it is 1 year or 5 years old. Another reason is that the trucks are built to suit the needs of every line of business and the style does not change to any great extent.—N. W. Buzby—Merchants' Motor Service Corp.—Dayton.

New York City.—I do not believe the second-hand truck problem is going to be at all serious compared with the pleasure car problem for the reason that buyers of trucks usually expect them to run until they are entirely worn out. This is not the case with pleasure car owners who bought new cars yearly merely because new body designs or improvements in the mechanism were made yearly and the owners desired to be in style and keep up-to-date.—R. T. Alcutt—Knox Automobile Co.—Knox.

Philadelphia, Pa.—There are practically no second-hand electric trucks of our make on the market and, therefore, the second-hand question is not a problem with us.—W. W. White—General Vehicle Co.—General Vehicle.

The Problem Should Never Prove Serious

Philadelphia, Pa.—There are comparatively few commercial cars which have been in use for a long period and these are generally considered so antiquated in view of recent improvements that even the owner does not expect more than scrap value for same as credit against the purchase of a new car. If cars in service are given proper attention by the manufacturer or agent and the right attention is insisted upon by the user, this second-hand proposition should never prove serious in the commercial field. There is not the temptation to discard a car in commercial use to obtain some slight refinement or luxury as is the case with a pleasure car.—E. S. Hare—Commercial Truck Co.—Commercial.

Minneapolis, Minn.—The present status of the second-hand truck problem is very bad just now. A merchant hates to suffer loss much more than a person seeking pleasure.—A. C. Showers—Chase Motor Truck Sales Co.—Chase.

Chicago, Ill.—We do not see any reason why trucks should be traded in after one or two years' service the same as is done with pleasure cars. A good truck, well built, should last several years, and if it is in good condition the owner would not want to trade it in.—J. P. Foraker—Foraker-Dayton Motor Truck Co.—Dayton.

CINCINNATI, O.—We believe the second-hand truck problem will be just as serious in a few years as the second-hand pleasure problem is to-day. Delivery cars and trucks are used harder than pleasure cars and in a couple of years' time a merchant will have depreciated his car to such an extent that he will require new machines. He will then, of course, want to get rid of his old car under the most favorable conditions and will seek trades. This condition we believe will exist as long as automobiles are made, as it is only natural for the merchant to protect himself and to deal under the most favorable conditions.—H. V. Ilg—Schacht Motor Car Co.—Schacht.

NEW YORK CITY.—Second-hand trucks we have not encountered, so are not in a position to speak, but we believe it is entirely different from the pleasure car proposition, as the value of a truck lies in the service left in it, not in its style and appearance.—F. F. Lewis—Knickerbocker Motor Truck Co.—Knickerbocker.

MINNEAPOLIS, MINN.—We figure that a good, standard truck depreciates about 20 per cent. per year. A man desiring to sell a truck used 4 years could expect to get only 20 per cent. of the original value. This does not apply to some of the early makes of trucks, as many of them are practically useless; nor does it apply to the cheaper trucks, as many of them depreciate 75 per cent. the first year.

A good standard truck, costing from $2,000 and up. will last many years, depending on conditions, of course.

A truck is not likely to be resold or to change hands as often as a touring car, if it is a good truck and giving satisfaction. A touring car, however, is sold and resold on account of the owner desiring a newer style, more power, etc. —G. D. Wilcox—Wilcox.

The Two Propositions Entirely Different

MINNEAPOLIS, MINN.—We think it will be several years before the second-hand truck problem will be in the condition that the second-hand pleasure cars are in now. Pleasure cars have been on the market now for about 12 years and trucks have only been in general use for about 4 or 5 years. —P. O. Downes Co.—Gramm.

NEW YORK CITY.—The second-hand truck problem is entirely a different proposition. We don't believe that the second-hand truck problem is ever going to be as serious a proposition as the second-hand pleasure car problem. A man who drives a car wants to have it absolutely up-to-date and new, and it is a question of personal pride with him. He wants his wife to be riding in a car that is this year's design, and he is willing to trade in his old car and pay several hundred dollars, possibly the difference, in order to always have a brand new one.

With the truck, however, a business organization is going to run a truck until it is worn out and then they will run it a little longer. The successful business man will never discard any piece of machinery that is earning money for him and whatever he could get for a second-hand truck would be less than what it would be worth to somebody else, because if it is possible for the second-hand dealer to repair this truck and sell it to somebody, who presumably is going to make money out of the use of it, then the business man could fix the truck up himself and make money out of using it.—M. R. Machol—Hydraulic Truck Sales Co.—La France.

PHILADELPHIA, PA.—The second-hand truck problem can never be compared to that of the pleasure car. Commercial cars are bought for service and will be used as long as they give service and then discarded.—E. C. Johnson—E. C. Johnson Co.—Reo.

Electric Conditions

Reports from Dealers with Regard to Electric Vehicle Sales from September 15 to October 15

General conditions have been good in the electric vehicle business and there is a tendency at the present time towards the purchase of electric trucks singly rather than in fleets; this shows the small merchant is buying.

THE general condition of the electric vehicle business during the period from September 15 to October 15 was good. It is a noticeable fact that the purchasing of electrics in fleets is giving way to single purchases, this seeming to show that the smaller merchant is becoming the buyer and also that the private retail business is beginning to understand the great value of the electric vehicle as a means of delivery in cities. The field of the electric is becoming more definitely defined, and the prospective buyer is not now worried with the question: "Which shall I choose, the gasoline or the electric vehicle?" If he troubles to analyze his problem with circumspection and sagacity, he will be able to choose at once.

Atlantic Conditions Have Been Excellent

THE ATLANTIC VEHICLE Co., New York City, finds general conditions to be most excellent and the prospects for the sale of trucks never better. As a matter of fact, the company sold all the trucks that it has so far been able to turn out of the shop and has in consequence found it necessary to increase the manufacturing facilities.

Recently the company has sold eight 2-ton trucks to the Adams Express Co., four 3½-ton trucks to the National Express Co., a 3½-ton truck to Maurice O'Means & Co., of New York City, and five 5-ton trucks to P. Ballantine & Sons and C. Feigenspan, brewers, of Newark, N. J.

The sales of the GENERAL VEHICLE Co., Long Island City, N. Y., for 30 days ending October 15 totaled 138½ tons capacity, and that period was remarkable for the sales to new customers in lines which the company has not heretofore been represented. The sales also covered a wider range of territory than usual. Bona fide contracts were signed for fifty-five machines and with one exception the average was about 2.4 per customer. Sales were made in San Francisco, Baltimore, Fitchburg, Mass.; Cincinnati, Waco, Texas; New London, Conn.; Newark, N. J., and New York City. Some new lines of business are as follows: Central Stamping Co., Newark, N. J.; Parkhill Manufacturing Co., Fitchburg, Mass.; General Chemical Co., San Francisco, Cal.; Wall Rope Works, New York City; N. E. Telephone & Telegraph Co., Boston, Mass.

The largest orders were from Wells Fargo Express Co., Chicago, 9; Peter Doelger, 8; National Express Co., 4; Schulz Baking Co., 2. Industrial trucks were sold to Pacific Mills, National Cash Register Co., Grand Central Terminal, and orders for coal trucks were received from two new customers.

Lansden Satisfied from All Points of View

THE LANSDEN Co., Newark, N. J., states that the general conditions of its business during the above mentioned period have been satisfactory from every point of view.

The ARGO ELECTRIC VEHICLE Co., Saginaw, Mich., has made no large individual sales of late, but the demand appears to be steady and prospects are very plentiful, the outlook for the coming year being promising.

SYSTEMS for MAKER and USER

Private Garages for Electric Vehicles

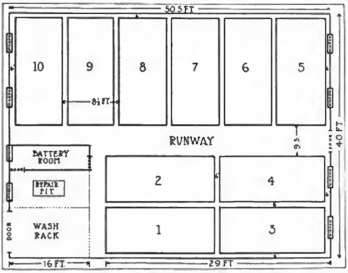
Examples Showing Size, Systems and Equipment

THE greatest economy of motor-truck delivery is reached only when proper attention is paid to the details of maintenance and operation. The questions of space available for garaging, the best way to obtain light and heat, the arrangement of the various dependent parts of the garage, must all be considered and disposed of with a view to eliminating all loss of space, time and money. Each and every user or prospective user of commercial vehicles must treat these problems in his own way, taking into consideration the facilities he has at hand.

In planning the electric vehicle garage first comes the question of space. In some cases it is possible to utilize a horse stable after remodeling it slightly, providing it is high enough and has a good floor. Probably a wooden floor was used in the stalls of the stable; if so, it should be taken up and some other material put in its place. Concrete is best.

The size and height of the garage depend upon the number and type of the vehicles it is to hold. A building 50.5 by 40 ft. or having a floor space of 2020 sq. ft. will easily hold ten vehicles of 5-ton capacity and permit of plenty of room for other garage fixtures.

The over-all length of a 5-ton electric truck is not more than 14 ft. and its width not more than 7 ft.; therefore, when each vehicle has a space 15 by 8 1-3 ft. in which to stand there will be sufficient room for a man to pass between them. The remaining 420 sq. ft. can be divided as follows: 160 sq. ft. for a wash rack, which should be sufficient, as no vehicle should be allowed to stand on the wash rack longer than necessary; 160 sq. ft. for a repair pit and repair space; 100 sq. ft. for a battery room. If the vehicles in use are fitted with van or express bodies a height of from 12 to 14 ft. is necessary in the garage and in any case plenty of clearance should be allowed.



A Practical and Economical Arrangement of a Private Garage for 10 Electric Vehicles of 5-Ton Capacity. The Vehicles Are Numbered in the Order of Their Exit. Both the Repair Pit and Washrack Are Large Enough to Hold Vehicles and the Battery Room Is 5 by 16 Feet. Between the Walls and the Vehicles There Is a Space of 6 Inches

In an installation of ten vehicles a spare battery is not imperative unless the trucks are being relayed on long runs. When spare batteries are used, suitable hand trucks may be employed to move them about the garage from vehicle to vehicle. These trucks should be about equal in height to the bottom of the battery case of the vehicle, so that the batteries can be easily removed and replaced.

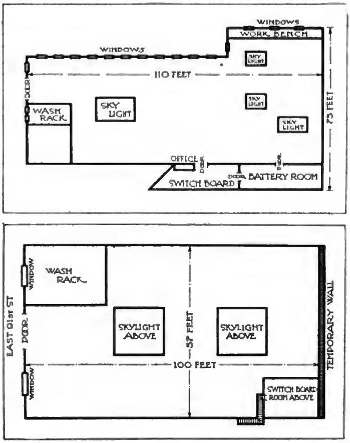
Spare parts and supplies for the battery room in a garage housing ten commercial vehicles of 5-ton capacity would be few in number, and the two principal constituents would be distilled water and acid. The amount of these materials used in any given length of time varies according to the duties of the trucks. Under normal conditions the amount of distilled water required would be about 10 gal. each week. This can be purchased in wholesale quantities and kept in a tank in the battery room, the tank being replenished when necessary. Three carboys of commercial sulphuric acid should be sufficient for one year. Other minor supplies, such as connectors, terminal screws, wire, etc., can be purchased in lots and kept on hand for emergencies.

The staff of men necessary to care for an installation of ten trucks is not very large. A battery man, who has complete control of the repairing of the batteries and the charging of the vehicles is the only extra help required. The night watchman in a brewing plant washes all six of the trucks besides attending to his other duties.

Repair Pit a Necessary Adjunct

The repair pit is a necessary adjunct, as it permits easy access to the motor and mechanism of the vehicle and facilitates repair work. It is of great economic value in the saving of time, and the location of it should depend upon the light and the proximity of the work bench. One firm with six vehicles in service and which maintains its own garage states that the repair pit in its establishment is used every night in the inspection and repair of the vehicles.

For the repair equipment for a ten-truck installation it would not be advisable to carry mechanical parts of great importance in stock. A set of spare tires is always a good thing to have on hand, and this auxiliary should consist of one front and one rear tire. Spare grease cups, insulating material, bolts, screws, etc., occupy very little space, and it is well to have them available. A jack should also be at hand



The Upper Floor Plan Is That of Jacob Ruppert's Old Garage, and the Lower Is That of the New. In Its Simplicity of Arrangement the New Garage Has Many Advantages Over the Old

Lubricating oils and greases of two kinds would probably be necessary factors in the maintenance of the vehicles. A light oil for the wheels and other points of the vehicle and a heavy grease for the differential and jackshaft should be all that is needed. The manufacturers of electric trucks recommend various kinds of lubricants and advise concerning the frequency of lubrication. Their advice should be followed in these matters.

Neither the switchboard nor the charging plugs will take up any space, the one being located on the wall and the others in the wall or in some similarly convenient place.

In a large installation some printed-card system of keeping record of the operations of the garage as well as the performance of the trucks should be used, as records of this kind tend to make the employees more systematic in their work and to eliminate all waste of material and time. Another advantage is the complete record of the performance and cost of each vehicle, which is always at hand. The methods of keeping these records differ only slightly, the usual card system consisting of an inspector's report, a driver's daily report, a charging sheet, a time and job ticket for the repairman and requisitions for drawing material from the stock department.

Jacob Ruppert's Garages

With the purchase of thirty additional General Vehicle electric trucks, which will make a total of 113 electric vehicles in service when they are delivered the first of March, the Jacob Ruppert Brewing Co. has found it necessary to increase its garage space and one-half of a new structure has already been completed. With this new building the total garaging space for the eighty-three commercial vehicles which this firm has in service is 13,950 square feet.

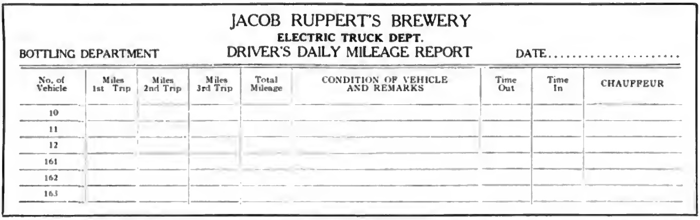
The old garage, formerly the cooper shop, is not large enough to house the present installation, having a capacity of but forty-five trucks. The remaining vehicles have been stored in the yard back of the brewery during the summer and the new structure is designed to accommodate them.

The horse-drawn vehicles which this firm previously employed are gradually being replaced by motor-driven trucks, but it will be a year or two before the horses are entirely eliminated. It is expected that when the process of elimination is complete, between 200 and 225 electric vehicles will be in the service of the firm.

Where an installation of motor-driven vehicles of this size is used, the garaging system must be complete to the last detail in order to attain the strictest economy of operation and maintenance. The system in use at Jacob Ruppert's garage is as complete and efficient as thorough study of the conditions and facilities can make it.

On this page is a floor plan of Ruppert's old garage, showing the arrangement of the various essentials, and below it is a floor plan of the half of the new garage that has been completed. It is intended to erect an up-to-date machine and repair shop in connection with this new garage.

The old T-shaped garage is 110 feet long with a 75-foot cross part. It is well lighted by windows, skylights and electricity. In the left cross-member of the T is a repairman's work bench. The battery room occupies all of the right arm of the cross part. A door leads from the garage proper into it and another leads into the switchboard room and superintendent's office from the battery room. The switchboard room also connects directly with the garage by means of a door. The plug connections are placed in pipes along the walls and on pillars at convenient intervals, there being enough of them so that all the vehicles at present



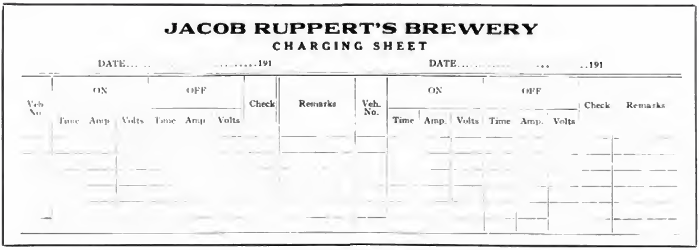
JACOB RUPPERT'S BREWERY

ELECTRIC TRUCK DEPT.

BOTTLING DEPARTMENT DRIVER'S DAILY MILEAGE REPORT DATE......................

No. of Vehicle	Miles 1st Trip	Miles 2nd Trip	Miles 3rd Trip	Total Mileage	CONDITION OF VEHICLE AND REMARKS	Time Out	Time In	CHAUFFEUR
10								
11								
12								
161								
162								
163								

The Sheet on Which This Report Is Printed Is 9.5 by 12.25 Inches. The Driver Fills In the Line at the Left of Which the Number of His Vehicle Is Printed, Signs His Name and the Report Goes to the Superintendent. There Are Separate Reports for the Drivers in the Keg and Bottling Departments



JACOB RUPPERT'S BREWERY

CHARGING SHEET

DATE..........................191 DATE..........................191

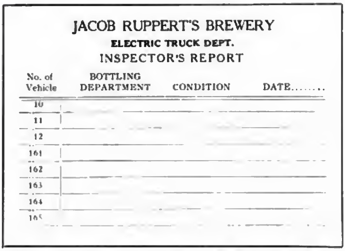
Veh. No.	ON			OFF			Check	Remarks	Veh. No.	ON			OFF			Check	Remarks
	Time	Amp.	Volts	Time	Amp.	Volts				Time	Amp.	Volts	Time	Amp.	Volts		

The Charging Sheet is 13 by 12 Inches. As the Vehicles Are Charged Their Numbers Are Entered in the Space Left for That Purpose

stored in the garage can be charged at the same time. At the right of the entrance as you go out is the wash rack, the vehicles forming in line each evening and awaiting their turn at the rack.

The new garage in its present state is much more simple in its arrangement than the old and is oblong, 100 by 75 feet, with a capacity for thirty-eight or forty vehicles. It is well lighted, there being a large window at each side of the door and windows placed at intervals in the right-hand wall, and there are two large skylights. Provision is made for electric light.

The switchboard room occupies a tower on the right-hand corner of the roof. Access is gained to it by a closed stairway on the outside of the building. There is ample plug service for charging all of the trucks at the same time. At the left of the entrance to the new building is a wash rack.



JACOB RUPPERT'S BREWERY

ELECTRIC TRUCK DEPT.

INSPECTOR'S REPORT

No. of Vehicle	BOTTLING DEPARTMENT	CONDITION	DATE........
10			
11			
12			
161			
162			
163			
164			
165			

The Inspector's Report is Printed on a Sheet 8.5 by 12.25. The Number of the Truck is an Important Feature of All These Reports

View of Jacob Ruppert's Old Garage, Showing Posts and Poor Lighting Which Interfere with the Storing and Care of the Vehicles

As most of the garage labor is done at night, the night crew is larger than the day crew, and consists of 11 men and the latter of 6 men. The night shift and its duties are: One switchboard man, one shifter, who moves the trucks from the wash rack to their places in the garage; one oiler, one battery man, who has one helper; three washers, one mechanic and two assistant mechanics. The day shift is composed of one battery man and his assistant, one record boy, whose duty it is to keep track of the records which are kept on each truck; one mechanic and his assistant, and the superintendent.

Four batteries are kept in reserve for emergency calls. It is sometimes necessary, especially during the rush season, to keep vehicles in operation 22 hours out of the 24, and these four batteries are held in reserve for such emergencies.

As soon as a vehicle comes into the garage and is ordered to go out on another trip, if the battery will not carry the truck through with what power there is left, it is taken out and one of the reserve batteries is substituted. The vehicle is then ready to go out on its trip and the other battery is put on charge. This relaying of the batteries makes possible the elimination of the one disadvantage of the electric vehicle in continuous service; that is its limited mileage capacity.

One other important feature of the garage service which helps to bring about the greatest efficiency of operation and a minimum of lost time due to accidents, etc., to vehicles on the road, is the emergency vehicle which is always kept in reserve.

Completely Furnished Stock Room a Feature

A completely furnished stock room containing spare parts of all the vehicles in service is maintained in connection with the garage, and a full line of tools is always at hand. It requires but a telephone call from the driver of a vehicle on the road stating that his truck is broken down and the repair parts that are needed and the emergency truck is dispatched with the parts and sufficient help and apparatus to do any work required of it.

Complete records are kept on printed forms covering each item and operation necessary in the care of each electric vehicle. There are two departments of the brewery, the keg and bottling departments, and the records are kept separately for these departments, different types of vehicles being used in each department. The printed forms on which these records are kept are reproduced here.

By means of this system of keeping track of the vehicles, the manager of the garage knows at all times the exact condition of every vehicle in his care, and if at any time he is called upon for a vehicle for extra service, as quite often happens, he knows instantly what truck to send. The trucks are all numbered and this number is used in keeping the record of their care, performance and cost.

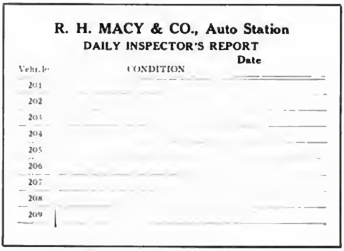
The foreman's and general inspections of the vehicles are, perhaps, the most important of the factors in the care of the installation as it is this inspection that insures service from the trucks. These examinations are made at least once each month and sometimes more frequently, depending upon what the driver reports on his daily mileage sheet. These two classes of inspection differ in that the one is merely general and is made whenever it is thought necessary and the other is a regular inspection covering all mechanical and other points. By means of this inspection all slight troubles which might not be noticed by the driver are discovered and remedied, all necessary repairs and adjustments being made or ordered made at the time of the inspection.

In the driver's daily mileage report he incorporates all essential facts, including the mileage on each trip, the report being arranged for three trips, the total mileage, the time the vehicle left the garage in the morning and the time of its return at the end of the day's work, and the general condition of the vehicle and other remarks. This statement is signed by the driver.

Daily Record of Charging Kept

A daily record is kept of the charging of each truck on a form which gives the vehicle number, the time when charging was begun, the voltage and amperage when the charging was begun, and the same data when the charging is finished.

View of Jacob Ruppert's New Garage in Its Semi-Completed State, Showing Simple Arrangement and Economy of Space Obtained



R. H. MACY & CO., Auto Station

DAILY INSPECTOR'S REPORT

Date

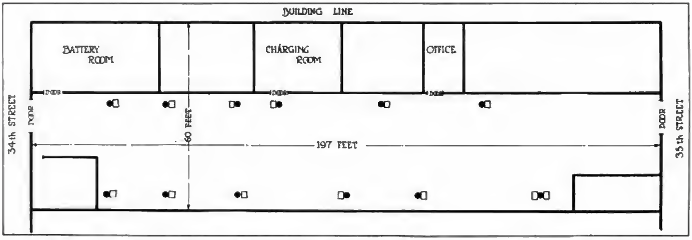
Vehicle	CONDITION
201	
202	
203	
204	
205	
206	
207	
208	
209	

This Inspector's Report is 7.5 by 20 Inches, the System of Inspection and Report Being Practically the Same as at the Ruppert Brewery

All of these forms hinge upon the largest and most important of them all, which is the cost form. On this printed sheet is kept a composite record of all the information given by the other forms, besides the actual cost of operating and maintaining each vehicle for one month. This form is printed on both sides and perforated for loose leaf binding so that a complete record of the cost of each truck for any month of any year is always available. This cost record does not include the overhead expense, such as interest on the investment, depreciation, insurance, taxes and similar expenses. Although the current for charging the batteries is generated at the brewery in the power plant belonging to that establishment, the cost of producing the amount of current that each vehicle uses per month is charged against that vehicle and entered on the monthly cost sheet.

All of these forms, as soon as they are turned in to the superintendent's office, are looked over by him and orders issued accordingly. After all the recommendations made on them have been attended to they are placed in their proper binders by the record boy, where they can be referred to at any time.

A novel and economical plan has been adopted by the R. H. Macy Co., the large New York department store, in the garaging of its fleet of 35 electric vehicles. The fleet, which is made up of thirty-three vehicles in the department store delivery service and two which are used in the delivery of milk for Nathan Strauss & Co., is housed in the driveway in the rear of the store, which is utilized also for the shipping and receiving of goods. The adoption of this plan does away with all necessity for extra space for a garage. Three different makes of vehicles compose the installation, there



The Floor Plan of the R. H. Macy Garage, Showing the Various Component Parts. The Stock Room is at the Right of the 34th Street Entrance

R. H. Macy & Co. Auto Station

DRIVER'S DAILY REPORT

DATE____________________

Vehicle	Miles 1st Trip	Miles 2nd Trip	Miles 3rd Trip	Total Mileage	CONDITION OF VEHICLE AND REMARKS	Time Out	Time In	CHAUFFEUR
201								
202								
203								
204								
205								
206								
207								
208								

This Report, Which Is 9.5 by 23 Inches In Size, Is Much the Same as That Made Out by the Drivers of the Ruppert Brewery Vehicles

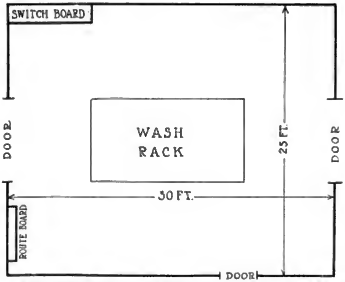
being eighteen Lansdens of 1-ton capacity, fifteen General Vehicles, fourteen of 1-ton and one of 2-ton capacity, and two Columbias of 1-ton capacity.

The garage space is 197 by 40 feet, the offices, battery room, etc., taking up 20 feet of the total width of 60 feet. As will be seen upon referring to the floor plan of the garage on page 33 there is plenty of room for storing the trucks, and some to spare, but as some of the gasoline vehicles are kept in the building considerable space is taken up by them.

At either end of the driveway are large doors. Upon entering the garage the stock room is at the right, on the left is the battery room, just beyond that the switchboard room which contains the "booster," and next the foreman's office.

Placed at intervals along both sides of the garage are large supporting columns, six on each side of the building. On these posts are terminals from which charging plug connections can be made. There is one of these terminals on each post and two on the post at the right hand side. The total number of these plug connectons is such that all of the vehicles can be charged at one time. In charging the vehicles the "booster" is used only during the winter months on extremely cold days.

Spare parts for all the vehicles are kept in the stock room, where everything from a cotter pin to a motor can be obtained when needed. In conjunction with the stock room one of the vehicles is kept in reserve for emergency calls for repairs to trucks disabled on the road.



The Methodist Episcopal Hospital's Combined Garage and Stable Is Shown in the Floor Plan. The Two Doors at Either End of the Building Open Into the Yard, the Vehicle Facing the Left Door When in the Garage

The reserve battery equipment consists of three different types of batteries, suited to the three makes of vehicles in service. Relay work is constantly being done by one of the electric vehicles. As soon as it returns to the store from its first trip the nearly exhausted battery which brings it in is removed, a freshly charged one replaces it, and the truck is ready for another trip while the battery that was removed from the truck is put on charge.

When it is taken into consideration that practically all of the men employed at the garage spend a good part of their time on the gasoline as well as the electric vehicles, it will be understood that if the two departments were segregated the staff of men employed on the electric trucks would be very small. There are, of course, two crews, the night crew and the day crew, there being six men in the former and two in the latter. The night crew and its duties are divided into three parts, there being two mechanics and one helper, one battery man who attends to the charging of the vehicles, and two washers. The day crew consists of the foreman, one mechanic, a battery man and a bookkeeper.

The card system by means of which a record is kept of all the operations required in the care of the trucks, and which makes possible a complete record of the cost of operation and maintenance of the vehicles as well as much valuable information in regard to their condition and service, is shown here in reproductions of the printed forms used.

Two Kinds of Inspection Are Used

Two kinds of inspection are employed, which are both included on the one card. The most important of these examinations is the mechanical inspection, which is made every night in the garage. The senior mechanic of the night crew assigns the men to the different vehicles for their inspection.

These inspectors cover thoroughly the mechanical and all other points in the vehicles, it very often happening that one inspector will have charge of the examination of the same vehicle quite frequently, and thus he becomes familiar with the truck and its eccentricities if it has any. Each inspector makes any repairs in his power at the time of the inspection and also fills out the inspector's report shown on page 33. Before any of the vehicles are allowed to leave the garage in the morning they must undergo a general examination by the foreman, and in making this examination the foreman is influenced by the report of the mechanical inspector handed to him that morning.

The driver's daily report is filled out by him at the end of the day's work, and after he has signed it he hands it to the foreman, who examines it closely. As will be seen upon referring to the reproduction opposite, the driver's report card is made out to cover three trips, giving the mileage on each trip, the time of leaving the garage and the time of return and also any other information the driver can give concerning the performance of the vehicle during the day.

The daily mechanics' report shown below covers both electric and gasoline vehicles. This report is made out by each mechanic after he has done repair work on any of the trucks.

The monthly expense statement lays particular stress upon the number of days that the vehicles have been in service and the number of days out of service, with the reason for such idleness. This whole system goes to make up an efficient and practical method of caring for commercial vehicles and tends towards greater economy of maintenance and operation.

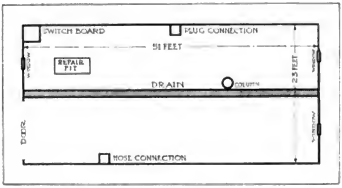
The Methodist Episcopal Hospital, Brooklyn, N. Y., has one Detroit electric ambulance in service and this ambulance is kept in the same building that shelters the hospital's horse-drawn ambulance. The same room contains both the horse-drawn and electric vehicles, the horse being kept in a stall opening off from this room.

Dimensions of Hospital Garage

As shown in the plan, this room is approximately 35 feet long and 25 feet wide. The large doors at either end of the building keep the interior well lighted, and there are electric light fixtures also. The switchboard is placed in the corner at the left of the main entrance and a plug connection extends directly from it to the vehicle. The floor is of concrete and slopes to a drain in the center so that the vehicle can be washed in its usual position. A door in the right hand wall leads into the stable, near it being located the water connections. In the right hand corner is a telephone and beside it a blackboard is so placed that it can be clearly seen from the driver's seat of the ambulance. On this blackboard are written notations relative to the condition of streets, bridges and other traffic conditions, so that when a call comes in for the vehicle the driver can see from his seat what routes to avoid in order to make the best possible time in reaching his destination.

The power for charging the batteries is obtained from the electrical plant which is maintained by the hospital.

The six General Vehicle electric trucks used by M. Groh's Sons to transport the product of the brewery are housed in the former stable, which their purchase rendered no longer necessary. This stable makes a very good garage for a small installation, and with the horse stalls torn out there is plenty of room for the new commercial vehicles. The building is approximately 51 feet in length and 23 feet in width. The switchboard is placed in the left hand corner and near it is a repair pit where repairs to the vehicles can be easily made. Midway on the left wall is the plug connection where six plugs are placed, permitting of the charging of all the trucks at the same time. In the center of the floor and extending its entire length is a drain, which allows washing anywhere in the garage and the water will soon run off. The only other fixture in the garage is the water connection in the right hand wall.



The Arrangement of the Former Stable Which is Used for Garaging M. Groh's Sons' Vehicles is Shown in the Above Floor Plan.

M. Groh's Sons Charging Record Board

Circuit	Truck No.	Amperes	Time of Charging	Volts	Finished	Volts
1						
2						
3						
4						
5						
6						

The Charging Record is Kept on a Blackboard Divided as Shown in the Tabular Form

The staff of men employed to look after this installation is very small, only two men besides the six drivers having anything to do with the vehicles. One of these men has charge of the batteries and their charging, and the other, who is also night watchman, attends to the washing of the vehicles.

The only tabular form of any description that is kept in connection with the garage is a blackboard, placed on the wall at the right of the switchboard.

R. H. Macy & Co. Auto Station

DAILY MECHANIC'S REPORT

Date

No. Car	Labor	Hours	Labor Cost	Gas. Gals.	Gas. Cost	Oil Qts.	Oil Cost	Material	Remarks

This Daily Mechanic's Report Covers Both Gasoline and Electric Vehicles. The Sheet is 12 Inches Square, There Being a Space Left at the Bottom for the Mechanic's Signature

THE EDITOR'S VIEWPOINT

DO NOT MAKE CIVIL WAR

SALESMEN of electric vehicles make a great mistake when they endeavor to bring out the superior merits of the electric truck in comparison with the gasoline truck. The electric and the gasoline truck each have a separate and different field; this field may occasionally overlap, for instance, when personal prejudice in favor of one or the other dictates choice, rather than the superior dictator, efficiency. Notwithstanding this, however, the interests of each machine ought not to clash, and those who set about illuminating the merits of the one by the demerits of the other are adopting a totally wrong and hurtful policy for both the vehicles concerned. There is no necessity to raise a civil war in the ranks of self-propelled vehicles when there exist powerful foes to be encountered. The horse, the inefficient salesman, the stupid buyer, the ignorant user, the reckless driver—these are the foes of the electric and the gasoline vehicle, and electric and gasoline vehicles must unite to defeat them.

Just consider for a moment the difference between the fields of gasoline and electric vehicles. The gasoline machine is for long distances to be overcome in the least possible time; the gasoline machine lives a more strenuous life than its electric brother, it has hard roads to manipulate, and it is designed for such service, whereas the electric is for the smooth street and the good pavement, essentially a city machine, smart in appearance, excellent for retail delivery with frequent stoppages. To compare the two fields is ridiculous. All comparisons are odious, and this one more so than at first seems apparent.

The outlook should be viewed from a much higher standpoint. The motor truck industry embraces electric and gasoline trucks. Both machines have made good in their own way. To make better they must combine. A salesman should point out how electric and gasoline truck service can be combined, how the electric can carry from store to customer, how the gasoline can fetch from wholesaler, out of town, to store. He should state exactly the field of each. Buyers do not understand the field of each; that is the main difficulty in giving them satisfaction. The salesman of the electric truck should understand the gasoline truck as well, and be able to tell a customer where he should use his electric truck and where his gasoline truck.

The best way for a man who is considering the purchase of a motor truck to find out the field of each vehicle is to stand in a thoroughfare of any big city, and just watch the vehicles as they go by. See who owns the electrics and who owns the gasoline trucks. Then put the question: Why does this brewer have an electric truck? Why does that florist have a gasoline truck? The answers can be found: The brewer will probably have a series of regular deliveries day by day through the city; he may also have spare electric power at his brewery; the florist's delivery problem, however, is different; it is not regular. He may have an order delivered from a distant suburb and immediate delivery requested, or his conservatories may be situated 50 or 100 miles out of town. That is the way to consider this problem. A solution is to be found only by downright examination of cold facts, and by the experience of others. Unfortunately, it is generally necessary that a man must be his own judge in such matters; he very often cannot trust the highly colored statements of over-eager salesmen. And once the salesman begins comparing his machine with a gasoline truck, or *vice versa*, then the customer may immediately jump to the conclusion that the salesman will not be of much use to him in arriving at a sane and definite conclusion.

Figure it out on paper, weigh points for and points against in each case, but do not compare. Don't go and say that the gasoline will save 50 cents a day because the cost of upkeep works out to that amount. Don't compare the cost of upkeep! Think of the service; that is the main point. The motor truck is a saver because of good and superior service, not because it is cheaper to buy and less costly to maintain.

MOTOR TRACTION FOR INTER-URBAN SERVICE

MOTOR traction has proved its value in city work; there now remains the problem of inter-urban service. Both electric and gasoline trucks ought to be able to cope with this question, the former providing good highways exist. But in addition to the horse a new competitor arises—the railroad.

Inter-urban delivery by rail when the distance is moderately short is not satisfactory. It is generally slow, and it is absolutely without pliability of any kind. Every business has to regulate itself by the railroads' time schedules. If a product must wait for a train it *must* wait. Yet if a product is late for a train there is no waiting on the part of the train. There has to be a curious mixture of clockwork punctuality attached to a system that does not fit in with other systems. These other systems are quite at the will of the last system, that of transportation and delivery, and that is none of the best. It centralizes method, and a foreign system has to be combined with an individual system.

The motor truck is the solution to the difficulty. Delivery is the last phase of manufacture. Consequently, delivery should be dependent on the first phase, delivery of raw material. In some cases the organization can be circular in character and the last and the first can be made as one. This is the ideal system, for then the whole movement is with circular surety and smoothness.

In inter-urban service delivery must be a part of the system. There is as much money to be made out of efficient delivery as there is out of a good product. But when delivery is left to an outsider, such as the railroad, it can quite easily be seen that the delivery is going to be systematized by a foreign element. The motor truck combines speed, cheapness and reliability with efficiency and advertisement. It completes the system, it renders finite an organization. It continues the circular movement of operations, and destroys the outside disturbing element.

It is in inter-urban service that the motor truck will eventually show its splendid prowess. Makers and dealers should look toward this end. With commissioners working at the renovation of highways and the laying down of good roads there should come an influx of motor traction. Factories will be linked up with retailing centers, and above all, the customer can be satisfied. With the satisfaction of the customer comes renewal of order. With a longer delivery arm comes an extension of the market.

Although delivery is the final phase of manufacture, the motor truck makes it a creative force. Delivery is no longer an unfruitful end but a blossoming beginning.

HOW TO WASTE AN EXPOSITION

THERE is no doubt at all about the advertising value of a good and well-organized exposition, but the value is often reduced to a very small amount by the folly of exhibitors. A man in charge of an exhibit should always put himself in the place of the man who has come to find out things, and imagine just what that man wants, how he would like to receive his information, and what effect the *way* of giving that information will have on him. The man in charge of the exhibit must look into the psychology of salesmanship.

A representative of this magazine visited the recent Electrical Exposition in New York, and his experiences were somewhat disappointing, with regard to information obtained from exhibitors. He asked at one truck exhibit whether trucks were being sold in fleets or singly, putting himself in the place of the buyer who wants to know whether he should test out one machine or take his chance with a whole lot. The salesman in charge replied that everyone was buying fleets, but scarcely had our representative digested this fact when he was informed by another salesman at the same exhibit, in the presence of the first salesman, that trucks were *not* being sold in fleets; that selling trucks in fleets was a fool proposition, and that buyers were purchasing the single truck. Our representative was confessedly somewhat bewildered and left the two salesmen to argue the point. At the same stand he asked for some catalogues, and was informed that he could have *one*, as catalogues cost money, and were not to be had gratuitously. He felt uncommonly inclined to decline even a half!

At another exhibit he waited for 10 minutes for someone to question, but waited in vain, although it was the busiest part of the afternoon. Again, at another stand, he could gather no information because although he called twice, the exhibit was left alone, to explain itself.

He asked a salesman what was the special field of the electric; he received the most enlightening reply: "Anywhere where it can be used." Another replied "Everywhere." Another, "Good roads," and with these he had to be contented.

When requesting a copy of a catalogue from one exhibitor he was told that they were sorry, but there was only one copy of the catalogue there, and that they could not part with.

Now this state of affairs seems very extraordinary. Here was a man seeking deliberately for information, with the above result. What good can an exhibit at the greatest exposition in the world do if this is the sort of treatment to which the enquirer is subjected? Nonsensical reasons are apt to linger in the memory; discourteous treatment is generally remembered, and still more so is absence! What good is a dumb show going to do for a truck manufacturer? The truck buyer is or should be one of the greatest questioners on earth. By the number of his questions he shows the vital importance which he attaches to the subject. He does not want to go and buy in a haphazard sort of manner. What must be his opinion of two salesmen, employed by the same firm, who in his presence give him absolutely contradictory statements? He must immediately arrive at the conclusion that one or other of them is a man who does not understand his own business, or even that both do not.

Next in importance to the efficient salesman at an exhibit comes a good supply of readable literature. The salesman should literally stuff the pockets of the enquirer with catalogues and cost figures, testimonials and facts regarding the industry. Give the customer something that will remind him of your arguments, something that he can take home and think over. When a salesman gives a catalogue to an enquirer the latter is doing him a favor by carrying it away.

To exhibit at a big exposition is a splendid advertisement, but to spoil the exhibit by leaving it self-explanatory, catalogueless, or in the charge of arguing salesmen, is a step toward bankruptcy—or should be.

THE COST SHEET AND THE DRIVER

TO figure cost correctly, not an item must be overlooked, and the estimates made must be founded on many examples. That is to say, there must be no slackening in the keeping of cost. It should be easier to keep the cost of motor vehicles than the cost of horse vehicles, because the mechanical nature of the former lends itself to mechanical methods, whereas the human element in the latter upsets many a careful calculation. The only human element that enters into consideration in connection with the motor truck is the driver. The driver should be the main point of consideration after the choice of the right truck, because the driver may be said to control cost. If the owner has been a sensible buyer he has previously figured out what effect the conditions of service will have on his cost sheet, but he cannot have estimated what effect his driver will have. The driver is the creator of accidents, the creator of idle time in operation, the creator of reckless speed and the ruination of tires. Surrounded as he may be with the finest organization, yet with him lies the destiny of the cost sheet.

1—Avery Light-Weight Gas Tractor Pulling Western Wagon Loader and Elevator Grader. 2—The Same, Pulling an Avery Five-Bottom, No-Man, Self-Lift Plow and a 7-Foot Disc in Sod. 3—Avery Light-Weight Gas Tractor Pulling an Avery Five-Bottom, No-Man, Self-Lift Plow in Sod Plowing at Big Sandy in the State of Montana; Tractor Owned by R. S. Andrews

The Cost of Operat

The Gasoline Tractor Has Thoroughly in All Kinds of Agricultural Work—This Has One Tractor That Takes

THE gasoline tractor is giving good results. From all parts of the country farmers are obtaining excellent work from their gasoline plows and tractors, and efficient work is accompanied by a diminution in cost which is surprising. Actual users testify to the reliability and practical nature of the gasoline tractor, and from the following opinions that we have obtained from owners the one big fact can be deduced, namely, that the gasoline tractor has been tested and has proved its value; it has come to stay, without a doubt.

Of course, it must be understood that the cost of plowing is a very flexible item and depends largely on the nature of the soil, the acreage to be covered and the original cost of the machine that is used. In some localities the breaking is done for as low as $1 per acre and in others for as much as $3 per acre. Local conditions largely influence the cost, and another item that must be taken into consideration is the man who is working the machine. It is generally believed, however, that about $1.50 per acre may be taken as a good conservative cost for breaking soil. Possibly plowing would work out to about from 50 cents to $1 per acre. These figures are estimated by the Diamond Iron Works, manufacturers of saw mill and transmission machinery, Minneapolis, Minn., who build a tractor specially adapted for road work on account of multiple speed being possible.

Over 500 Acres of Stubble Land Plowed

One user of an Avery 20-h.p. gas tractor, after using same for a period of 45 days was of the opinion that the machine was extremely practical and simple. During this time the engine worked perfectly, and the only trouble was with the springs. These were tempered too hard, but the defect was remedied by the substitution of different springs. Over 500 acres of stubble land were plowed, including 70 acres of timothy and brown grass sod that had lain for five years and

Cost of Operating International

FIGURES RELATIVE TO HORSE PLOWING

Northwest District	OUTFIT		Cost of Outfit	Interest on Investment at 6 Per Cent	Depreciation Per Day at 10 Per Cent	Wages of Driver Per Month	Wages Per Day	Board of Driver Per Month	Board Per Day	Feed for Horses Per Day	Acres Plowed Per Day
	Number of Horses	Size of Plow									
Ia.—Cedar Falls	4	24"	$675.00	$.14	$.23	$30.00	$1.00	$20.00	$.67	$1.50	4
Ia.—Dubuque		......	......	......	......	......	......	......	......	......	......
Wis.—Eau Claire	2	14"	400.00	.08	.13	34.50	1.15	15.00	.50	.90	2
N. D.—Fargo	5	14"	1000.00	.20	.30	30.00	1.00	15.00	.50	1.50	5
Mont.—Helena	16	4-14"	2375.00	.48	.79	160.00	5.33	120.00	4.00	12.00	8
	2	14"	398.00	.08	.13	30.00	1.00	15.00	.50	1.26	2½
Minn.—Mankato	4	14"	825.00	.17	.27	30.00	1.00	15.00	.50	2.52	5
Ia.—Mason City	4	12" Gang	665.00	.13	.22	30.00	1.00	12.00	.40	1.50	4
N. D.—Minot	3	16"	650.00	.13	.22	50.00	1.67	20.00	.67	1.50	2½
Ia.—Fort Dodge	3	16"	635.00	.13	.21	33.00	1.10	20.00	.66	1.60	2⅓
N. D.—Grand Forks	5	14"	1025.00	.21	.34	35.00	1.17	15.00	.50	1.62	5
Minn.—St. Cloud	4	14"	700.00	.14	.23	25.00	.83	15.00	.50	4.00	4½
Ia.—Sioux City	4	16"	695.00	.14	.23	30.00	1.00	16.00	.53	2.00	3
S. D.—Sioux Falls	5	14"	1165.00	.23	.39	52.00	1.73	13.00	.43	2.39	5
S. D. Watertown	15	6-14"	2695.00	.54	.90	120.00	4.00	45.00	1.50	7.00	15

g Gasoline Tractors

oved Its Vast Superiority to the Horse Shown by the Fact That One Farmer e Place of Thirty Horses

had been thoroughly tramped down. The high speed was used all the time, and 20 per cent. grades were overcome with ease.

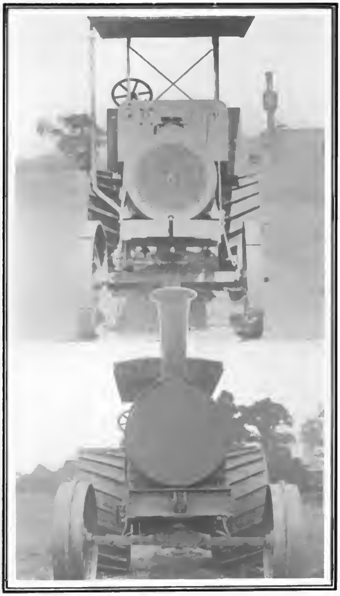
A Montana farmer plowed 400 acres of sod and 225 of stubble and 100 acres were double plowed and seeded, while 300 acres of sod were worked down ready for seeding. This equals in all about 900 acres of plowing, and the engine is working in quite good shape and has done so all through the spring. The machine used in this case is an Avery 35-h.p. gasoline tractor. To do the same amount of work the farmer would have required thirty horses and six men, whereas now the tractor is worked by only one man. The acreage plowed per day amounted to from 12 to 15, while 1¾ gals. of gasoline went to each acre.

Similar results shown in the accompanying tables give additional evidence of the vast superiority of the gasoline tractor over the horse machine. In fact, the latter may be taken as a relic of a past and almost forgotten day.

Another Montana farmer has experienced good results with a light tractor very suitable for covering soft ground. About 2 gals. of gasoline were consumed per acre, but the quantity varied according to the nature of the ground. Only one man is necessary to operate the machine. On fair ground the engine will handle five plows.

Average Cost per Acre—One Dollar

Still another Montana farmer has sent us some very interesting figures. He has a 20-h.p. Avery gas tractor and a set of five automatic self-lift Avery plows. These are working over 440 acres of land. In breaking the raw prairie in this state three plows have been in use. The breaking out here is exceedingly hard work and requires a great amount of power. The average cost per acre amounted to $1, while the cost of working the land over and putting the raw sod into a good seed-bed condition amounted on an average to 50



The Illustration at the Top Shows a 30-Horsepower Daimler Petrol Tractor Being Used for Agricultural Work in England and on the Continent. The Lower Illustration Depicts a 100-Horsepower Daimler Petrol Tractor Manufactured by the Same Firm Which Makes a Specialty of Petrol Tractors and Motor Agricultural Apparatus for Home and Abroad

rvester Co.'s Gasoline Tractor

FIGURES RELATIVE TO TRACTOR PLOWING

OUTFIT		Cost of Outfit	Interest at 6 Per Cent on Investment	Depreciation at 10 Per Cent	COST OF FUEL			Cost of Lubricating Oil	Wages of Operator Per Day	Board Per Day	Wages of Plowman Per Day	Board Per Day	Number of Acres Plowed Per Day	Cost Per Acre Per Day
					Cost Per Day	Price Per Gallon								
H. P.	Number of Plows					Kerosene	Gasoline							
25	6	$2000.00	$.40	$.67	$2.75	....	$.11	$.25	$2.00	$.67	$1.50	$.67	12	$.74
....	....	....	......	......	....	....	....	.....	.....	.....	.....	.....	..	......
20	4	1500.00	.30	.50	2.16	....	.10	.40	2.00	.50	.....	....	08	.73
25	6	2200.00	.44	.73	3.50	$.12	.17	.75	3.00	.65	1.50	.65	18	.62
20	4	2175.00	.44	.72	6.00	.17	.20	.80	1.33	1.00	1.33	1.00	10	1.26
25	6	2150.00	.43	.70	2.66	.07	.12	.45	3.00	.50	2.00	.50	2½	.68
45	10	3000.00	.60	1.00	4.62	.07	.12	.60	3.00	.50	2.00	.50	25	.51
25	8	2300.00	.46	.77	3.60	....	.12	.75	3.00	.50	2.00	.50	20	.58
45	10	3500.00	.70	1.17	7.50	.10	.15	1.00	2.00	.70	1.50	.70	25	.61
25	6	2250.00	.45	.75	1.57	.03	.11	.40	2.50	.70	1.50	.70	15	.57
25	6	2250.00	.45	.75	2.95	.09	.14	.80	4.00	.50	1.35	.50	16	.67
25	6	2400.00	.48	.80	3.50	.10	.14	1.00	1.75	.50	1.75	.50	15	.68
25	6	2300.00	.46	.77	1.85	.07½	.12½	.25	3.50	.53	1.20	.53	15	.61
25	6	2250.00	.45	.75	3.50	.08	.14	1.15	2.00	.50	2.00	.50	13	.80
25	6	2250.00	.45	.75	3.00	.08	.12	.40	2.00	.57	1.50	.57	15	.62

Form Sent to Avery Owners by the Makers for Estimating Costs

AVERY OPERATION COST BLANK—FIELD WORK

Name of owner *H. E. Hammer.* **Address** *Mellette* **Date** *6-18-12*
Name of person making report *H. E. Hammer* **Address** *Mellette*
Name of machine *Avery* **Size of machine** *35-20*
Name of driver *Roy Spink* **Self, son or hired** *By month*
Date of purchase *Apr 1st, 1912* **Wages of driver** *$75 per mo*
Repairs required *1 gear broke but no fault of engine* **Cost of Repairs** *$20*

PLEASE FILL OUT THE BLANK BELOW FOR EACH KIND OF WORK YOU HAVE DONE

KIND OF WORK	Acres per day	Gasoline Gallons used per day	Cost of Gasoline per Gallon	Gallons Lubricating Oil used per day	Cost of Lubricating Oil per Gallon	Men Required to Operate Machinery	Men Required to do the same work in the same time with Horses	Horses Required to do the same work in the same time
Plowing.. *Breaking*	*380*							
Plow. & Harr... *Stubble*	*270*	*1400*	*15.07*	*175*	*.35*	*Day 1*	*5*	*Day 20*
Harrowing						*Night 1*		*Night 20*
Disking.... *Double*	*380*							
Seeding								
Grain Harvesting		*Best day's plowing was 20 acres of stubble in high gear from sun to sun*						
Corn Harvesting								
Mowing								
Hauling Manure	No. loads per day							
Pulling Hay Loader	No. loads per day							
Grading Roads	Miles per day							
		Run nights some of the time.						

Remarks *It cost me including all help $451.75 to do the above work and my engine is now very little the worse for wear. Expect to pull three binders this summer and I also expect this engine and plow to have paid for itself by Dec. 1st, 1912. H. E. Hammer*

cents per acre. A packer, disc harrow paralyzer and a two-section harrow are used in working the land over. Between 6 and 8 acres of land are plowed per day, using three plows, at a speed approximating 3 miles per hour and consuming 2½ to 3 gals. of gasoline per acre, according to the toughness of the sod.

A farmer in Illinois is using a 35 to 40-h.p. Avery tractor, and with it he has plowed 20 to 26 acres per day, working at a speed of between 2 and 3 miles per hour and consuming close to 2 gals. of gasoline per acre. His son, 19 years old, plowed for corn nearly 30 acres each day with the machine, managing the engine and plowing quite alone. He had to arise early in the morning and work late into the evening, however, to get this excellent result. A self-lift Avery plow is used with the tractor, cutting 14 in. into the ground. The engine is run with small pinion slow gear. The only thing that has at all worried the owner is the ignition, but this was only due to inexperience. He also had no practice in economizing with gasoline.

A farmer in Donaldson uses a 20-35-h.p. Avery tractor and plows 18 to 20 acres per day at a rate of 2½ miles per hour on ordinary ground and consuming about a gallon of gasoline to every ¾ acre. He has plowed 20 acres with 30 gal. of gasoline, and this can be taken as a good round figure.

Vermond and Quellennec Rotary Plow Which Took Part in the Agricultural Tests at Bourges, France, Described on Page 42

A test was made by a user of a tractor manufactured by the Heer Engine Company for time and gasoline used on 2 acres of land. The time was 1 hour and 20 minutes, at a cost of 62 cents per acre. The plowing was done on low speed, pulling plows 6 to 7 in. deep on the very hardest land that had formerly been flooded with water practically every two weeks throughout the summer, this process of alternate wetting and drying rendering it as hard as a road.

The Goold tractor did well in the recent Winnipeg tests. It plowed at a cost of 47 cents per acre as the cost of gasoline. There was one plowman and a man driving the engine. In 2 hours and 50 minutes 3⅜ acres were plowed. It is to be remembered that the average cost of an engineer to drive a gasoline engine in this country is about $5 per day, the day's work being about 12 to 14 hours. A plowman would cost at an average figure $2.50 per day. This engine was a comparatively light one, and although the heavier type may do more work, yet it is not so capable of being used on miscellaneous kinds of grounds.

Avery Tractor in North Dakota

A North Dakota farmer is using an Avery tractor, and the results already obtained from it are as follows: 560 acres plowed, 120 acres disked, 270 acres seeded and 400 acres harvested at the following mileage per hour: 2½ miles plowing, 2½ miles seeding, 2¾ miles harvesting. Per day this farmer plows 17 to 20 acres, disk 60, seeds 60 or harvest 40. The cost per acre is as follows: Plowing, 45 cents; disking, 14 cents; seeding, 22 cents; breaking, $1, and harvesting, 30 cents.

Good results have also been obtained with the Aultman & Taylor engine. A farmer in Kansas has a 30-60 gas engine and 40 x 60 separator, with all attachments for threshing wheat, manufactured by the Aultman & Taylor Machinery Company. In the winter this engine was used for 34 days in the coldest weather. It has been run by the owner alone all through the season, and has saved $3.50 per day for a man and team hauling water and $4 per day for running the engine. He has saved just $210 for help, which otherwise would have had to have been paid out if a steam engine had been used since July 10 to the end of August. The engine has been used 62 days for threshing, and during that time not five minutes were wasted on the engine's account. The machine was also used for grading roads. A plow, plowing 7 in. deep, is used, and the engine handles it with ease.

Another user of an Aultman & Taylor tractor in North

Dakota has plowed 740 acres with it at a total cost of $688.20, using 2.36 gal. of gasoline per acre. The ground was pretty stony into the bargain, and eight plows were used. The owner figures that if ten instead of eight plows had been used the plowing would only have cost 74 cents per acre, whereas it actually cost about 93 cents per acre. This is figuring all costs, such as repairs, blacksmithing labor board oil etc.

A farmer in Valley City, North Dakota, was warned that his new tractor would not be able to travel over the hills. Regardless of what was said the engine was taken out with a ten-bottom plow. This was one of the heaviest plows on the market and weighed nearly 2 tons. Upon starting, two of the stubble bottoms were removed and the job was commenced with eight bottoms. After having continued for two or three days in this manner nine bottoms were put on, and after a week or 10 days more the ten bottoms were put on, and the machine has since been used like this, thus defying all pessimistic prophesiers. The engine has proved satisfactory both as to wear and power furnished. The section of country over which it worked is cut up by two lakes, and around these lakes are a number of very steep grades. For short spaces these grades run as high as 30 per cent. The land plowed was new land and had never properly been broken or plowed before. There were large stretches of unbroken ground, and the other large pieces had only been touched here and there by the p'ow, and not any of the ground had been plowed to exceed 3 in. About 400 acres have now been finished, from 4 to 6 in. deep.

Eighty-eight Cents per Acre in Texas

The Rio Grande Plantation Company, of Texas, are using an Aultman-Taylor gas tractor, and this is doing excellent work. It is pulling two four-disc La Crosse engine plows, cutting 7 ft. wide and 10 in. deep. In checking up the first 90 acres plowed it was found that the total cost, including engineer, p'owman, fuel and all kinds of oil used, amounted to 88 cents per acre. Before buying this outfit the Rio Grande Plantation Company had given a contract for the same plowing at $3.50 per acre, to be plowed with disc plows drawn by mules, but owing to the hardness of the soil it was impossible to do this work in a satisfactory manner. Accordingly the gas tractor was bought, thereby saving $2.62 per acre.

Bajac Locking Mechanism Being Put in Position at Bourges, France, at the Agricultural Tests Described on the Next Page

An Aultman-Taylor tractor at Benchland, Montana, is pulling two sections of Emerson disc plows and four sections of lever harrows, and in 22 days 810 acres have been plowed, with no repairs and no lost time with the engine.

A farmer in Normal, Ill., uses an Avery tractor with a 5-bottom plow followed with 2-section harrow. The spring plowing with this machine cost him 71 cents per acre for 120 acres. This figure included gasoline and lubricating oil, together with labor of men and their board, but no allowance was made for interest on investment or for wear. As yet, however, no breakages have been experienced.

An Aultman-Taylor gas engine tractor in Ashland, Kas., has plowed 280 acres of stubble land and traveled 10 miles on the road with 430 gallons of gasoline and has done the work in 8 days. This is on an average of 35 acres per day and the engine is working with entire satisfaction.

Cost of Operating Avery Gasoline Tractors Obtained from Actual Users

AVERY OPERATION COST BLANK—FIELD WORK

Name of owner *S. M. Melstad* **Address** *Mountain, N. D.* **Date** *7-16 12*
Name of person making report *S. M. Melstad* **Address** *Mountain*
Name of machine *Avery Gas Tractor* **Size of machine** *20 H P.*
Name of driver *S. M. Melstad* **Self, son or hired** *S.M.*
Date of purchase *Apr. 1st* **Wages of driver** *$3.00*
Repairs required *None* **Cost of Repairs** *None*

KIND OF WORK	Acres per day	Gasoline Gallons used per day	Cost of Gasoline per Gallon	Gallons Lubricating Oil used per day	Cost of Lubricating Oil per Gallon	Men Required to Operate Machinery	Men Required to do the same work in the same time with Horses	Horses Required to do the same work in the same time
Plowing *250 acres*	*22*	*30*	*17 9-10*	*3*	*50*	*1*	*3*	*12*
Plowing and Harrowing								
Harrowing *400 acres*	*200*	*22*	*17 9-10*	*3*	*50*	*1*	*3*	*12*

Remarks: *To do the same work with horses, I mean to plow as deep as I did with engine, it would have taken six good horses on the gang plow or eighteen horses on six bottoms.*

Name of owner *H. H. Harris & Son* **Address** *Champaign, Ill.* **Date** *5-28-12*
Name of person making report *H. C. Derr* **Address** *Harris, Ill.*
Name of machine *Avery Gas Tractor* **Size of machine** *20-35*
Name of driver *H. C. Derr, Jr.* **Self, son or hired** *Hired*
Date of purchase **Wages of Driver** *$3 00*
Repairs required **Cost of Repairs**

KIND OF WORK	Acres per day	Gasoline Gallons used per day	Cost of Gasoline per Gallon	Gallons Lubricating Oil used per day	Cost of Lubricating Oil per Gallon	Men Required to Operate Machinery	Men Required to do the same work in the same time with Horses	Horses Required to do the same work in the same time
Plowing	*15*	*25-30*	*13*	*2*	*27*	*1*	*3*	*12*

Remarks: *Depending on conditions of ground; my ground has been in no condition to plow. More or less wet spots taking more gasoline and time. H. C. Derr, Harris, Ill.*

Important Plowing Tests at Bou

The Two American Machines Were a Case and an International Harvester—Both Did Well

BOURGES, FRANCE, Oct. 7.—France and America have just competed in practically the most important plowing competition that has yet been held in this country. Nine machines took part in the practical tests. The event was arranged by the Central Automobile Club with the assistance of the Agricultural Commission of the Automobile Club of France. The competition was decided on the amount of plowing done, the depth attained, ease of operation, fuel cost and freedom from breakdowns. As, however, the machines vary very much in original cost it is difficult to place them in order of merit.

Case Worked at 52 Cents per Acre

The most successful from a fuel cost base only was the J. I. Case Co.'s steam tractor, which worked at the rate of 52 cents per acre, using compressed coal. This was the only steamer, all the rest being of the internal combustion type and all but one running on benzol. Three men were used with the Case, whereas with most of the others only one or two men were necessary. Following the Case came the De Mesmay, the Lefebvre, the Bajac, the Filtz and the International Harvester Co.'s machine, the latter at a cost of $1.50 per acre. All these did valuable work.

J. I. Case Co.'s Steam Tractor with Eight Plows
Lefebvre Caterpillar Machine at Bourges

Plowing Competition for Motor and

Machine		Width Land Plowed	Speed in m.p.h.
International Harvester Co	1st day	74 in. 5 plows	2.2
	2nd day		2.6
Bajac	1st day	58 in. 4 plows	2.9*
	2nd day		2.2
Lefebvre	1st day	31 in. 3 plows	2.5
	2nd day		2.1
Piltz	1st day	27.5 in. 4 plows	2.8
	2nd day		2.0
Motoculture Francaise	1st day	78 in. 100 hooks	0.39
	2nd day		
Vermond & Quellennec	1st day	66 in 99 picks	0.86
	2nd day		
Gilbert	1st day	19.5 in. 2 plows	1.6
	2nd day		1.7
De Mesmay	1st day	19.5 in. 2 plows	0.31
	2nd day		
Case Steamer	1st day	88 in. 6 or 8 plows	2.6
	2nd day		2.2

*Speed of tractor only 6 to 8 miles an

The two American machines were standard models. The French machines in comparison were designed for smaller areas and in mechanism were more complicated and, generally speaking, of a high mechanical finish.

Description of the Bajac Tractor

The Bajac, Lefebvre and Filtz gave about equally good results, although representing three entirely different types of machines. The Bajac, which is built by the Bajac Co. in conjunction with the De Dion Bouton Co., is a tractor with a winding drum having a sufficient length of cable to haul a plow across a field about 100 yards in length. The tractor carries its motor, a four-cylinder of 35 horsepower, identical with those used on the Paris omnibuses, forward under a bonnet, transmits through a clutch and a propeller shaft to a combined gearbox and differential housing and takes final drive by transverse shafts having pinions meshing with internal gears on the large diameter road wheels. The propeller shaft is continued rearward and drives a vertical shaft on which is mounted the winding drum, this latter being immediately under the platform body. Used as a tractor, the machine has a speed of 6 to 8 miles an hour; its plowing speed is from 2.25 to 3 miles an hour, according to the nature of the ground. As the tractor has to place itself on the opposite end of the ground to that occupied by the plow and has

for French and American Machines

The Best French Machines Were the Bajac, Lefebvre and Filtz, All Designed for Smaller Areas

en Agricultural Machines at Bourges, France

len m- yed	Fuel Used	Fuel Used, Gals.	Working Time, Hrs. M.	Total Stops, Mins.	Fuel Consumed Per Acre Gals.	Fuel Cost Per Acre
2	Benzol	11.6	5:34	0	4.1	$1.50
		14.3	2:47	25		0
2	Benzol	11.6	5:14	22	[illegible]	$1.20
		7.8	3:35	20		
2 or 4	Benzol	10.4	4:37	20	3.19	$1.16
		9.7	3:54	41		
3	Benzol	4.4	4:14	28	3.4	$1.22
		6.3	4:13	34		
1	Benzol	10.3	3:45	0	9.91	$3.60
			1:40	64		
1	Benzol	13.5	5:13	0	7.04	$2.62
				Many		
2	Gasoline	1.6	0:44	Many	11.4	$5.20
			0:58	Many		
2	Benzol	4.1	3:20	28		$0.74
		1.6	2:40	4		
1	Coal bricks	947 lbs.	3:20	15	638 gals. of water	$0.52
		661 lbs.	2:40	0	479 gals. of water	

cm. per litre; gasoline at 50 cm.; coal at 38 fr per ton

this latter to it, a quick automatic locking arrangement is necessary. This is obtained by a couple of stout triangular frames through the base member of which projects a stout steel prod. Suspended at the rear, these two frames can be raised and lowered by means of a winding drum operated by the driver, and when lowered one of the sides of the triangle is in contact with the road wheel and another is on the ground. By backing a short distance the prod is forced into the ground and the greater the strain on the cable the more tightly the rear wheels are wedged.

The Three-Wheeled Lefebvre Tractor

The Lefebvre is a direct hauler, being a three-wheel tractor to which a balanced plow is attached. The machine is distinctive by reason of a caterpillar device for securing traction on soft ground. The tractor is provided with an external trussed frame, the fore end of which can be raised or lowered by a worm and screw belt driven off the motor; at the front end of this frame is a sprocket of the same diameter as the rear one, and a chain surrounding the two. Around the chain, and attached to it, is a broad leather band carrying the projecting blades already mentioned.

The Filtz machine is a four-wheel bogey carrying a 25-horsepower gasoline motor under a bonnet, having the driver's seat in the center and the raditor at the extreme rear. Through a cone clutch the power is transmitted to a propeller shaft, a pinion on the extremity of which engages with a crown bevel gear on a transverse shaft. There are two crown wheels on this shaft with an arrangement for bringing either one or the other into engagement with the driving pinion. On one end of the jackshaft is mounted a grooved pulley, outside the frame member, and there is a second and similar idler pulley also outside the frame member. A fixed cable rigidly attached to each extremity of the land to be plowed is given four or five turns round these two pulleys and according to which pinion is in engagement the machine will haul itself and its plow across the field in either direction.

Three Types of Rotary Plows

Three different types of rotary plows were presented, but not one of them went completely through the two days' test. There were two Vermond & Quellennec machines, similar in principle, but differing considerably in construction. Only one actually plowed, the other being held up first by mechanical troubles, then by reason of its inability to get over the soft ground to the field. The De Mesmay and Gilbert machines are only of value for small work.

Filtz Machine in Agricultural Test at Bourges
International Harvester Co.'s Machine with Five Plows

Idle Time in Loading

Further Examples of Trips on Actual Trucks Supplementary to Those Given Last Month

Loading and unloading are the two operations in which the most time is lost. A great part of the loss is due to carelessness and can be eliminated by greater system.

SEVERAL typical examples of the operation of commercial vehicles in various parts of the city of New York were given in the last issue of THE COMMERCIAL VEHICLE, and two more examples, one of a 5-ton truck owned by the Ames Transfer Co., and the other of a 10-ton truck used by the Sheffield Farms-Slawson-Decker Co., are given below.

The only way to figure out lost time in operating a truck is to make an exact study of the time taken up by the various incidents in a complete journey of a truck which may represent a typical example of that truck's work. The fact that the power of a truck is uselessly wasted if its stops are lengthened is now universally recognized, but it seems that amongst the usual run of owners the fact is enwrapped in a shadowy kind of atmosphere of accepted theory. There is no use in accepting a fact as a fact and treating it as a fiction. The comprehensive and exact analysis of actual results obtained which we have frequently made in this magazine refer to all classes of business and any man can adapt the knowledge obtained therefrom to his own special requirements.

Let the Owner Make a Trip Himself

An admirable plan would be for the owner of a truck to accompany that truck on a typical journey and make a time analysis of it similar to the tabulated analysis which appeared in last month's issue of THE COMMERCIAL VEHICLE, and thus ascertain whether or not his drivers are wasting time. Actual and personal examination will alone convince a man. The motto for the owner is: "Get out and learn"!

The trip with the Pierce-Arrow 5-ton truck used by the Ames Transfer Co. in hauling builder's materials, was the only one on which there was a loss of time due to mechanical troubles. This mechanical trouble was not the fault of the truck, but of the very hilly, rough roads over which the hauling was done. The truck's place in the order of loading was lost on account of the trouble, which was the breaking of the fan belt, requiring 20 minutes to replace with a new belt. The loading was begun at 10:14, the cement being loaded in bags of 100 pounds each from a canal boat in the Harlem Ship Canal near 225th street. A crane on the canal boat raised the bags, 5 each time, to a point where they could be reached by the driver's helper on the truck. Four men were employed in the operation, one to place the load, another on the boat to swing the load, and two in the hold of the boat to place the bags in the crane. The loading was finished at 10:30 and the truck left the loading point at once. The vehicle had to pass over the drawbridge, and as that was open 6.5 minutes were lost. The arrival at the delivery point at Gunhill Road, near Jerome avenue, was at 10:59, a distance of approximately 3.5 miles having been covered. A horse truck was at the unloading point and the truck was sent up a narrow alley to unload; 2 minutes were lost in backing around before the load could be dumped. The work of dumping the load and adjusting the dumping body required only 2 minutes and 2 minutes were lost in backing out again. The truck left the delivery point at 11:05 and arrived at the loading point at 11:21. No time was lost in getting into the loading position this time as the schedule had adjusted itself.

Better arrangements for unloading the vehicle would have resulted in a saving of several minutes which were lost in this case in backing in and out of the narrow lane.

Sheffield Farms-Slawson-Decker Co.'s Truck

A 10-ton Hewitt vehicle used by the Sheffield Farms-Slawson-Decker Co., was the next truck of which time records were taken. It pulled into the loading shed at 7:27 and the loading was begun at 7:29, the 2-minute interval being used to back the truck up to the loading platform and part of it was lost as the men had not started the load out from the warehouse. The load consisted of 280 cases of milk, their total weight being approximately 19,600 pounds. There were 11 men in all employed in the loading operation, which was finished at 7:39, most of the men being distributed along the carrier which brings out the milk. The carrier consisted of a series of a rollers about knee high from the ground. The truck left the warehouse at 7:42, the space of time being used to fasten the load at the rear of the truck. No traffic was encountered on the way to the Long Island Express depot in Long Island City, where the truck arrived at 8:26, the distance being approximately 4 miles. It was necessary to wait 11.5 minutes before unloading could be begun as another truck was being unloaded. The unloading was begun at 8:37.5 and finished at 8:57, 5 men unloading the milk by hand into a freight car. After the unloading was finished the truck pulled up to another freight car and picked up a load of 380 empty cases. The loading was begun by 9:01 and finished at 9:24, the same 5 men being employed in the operation. The truck left the depot at 9:29 and arrived at the warehouse at 10:08, the interval between the time the loading was finished and the time of departure being used in fastening the load on the rear of the truck. Unloading was begun at 10:10 and finished at 10:21, the driver and his helper unloading from the truck and one other man placing the load inside the warehouse.

Not Much Time Lost in This Case

This truck has two trips to make every night, the first being the one described and the second a trip to Brooklyn. The only places in this system where time could have been saved were at the loading point where one minute could have been saved if the load had been ready and at the depot in Long Island City, where a different arrangement of unloading points would have entirely eliminated all waiting and waste time on the part of the vehicle.

Grade Crossings Law

Which Is to Blame in Case of Accident —the Railroad or the Driver of the Motor Vehicle?

According to the rule laid down by the United States Circuit Court of Appeals the driver must stop, look and listen when approaching tracks where there is restricted vision.

AS long as grade crossings exist catastrophes will occur, and the question arises which of the two parties concerned, the railroad or the highway traveler, is to blame. In all the recent discussion concerning grade-crossing accidents to motorists one point on which the whole question of legal liability may hinge has utterly escaped attention, namely, that almost every State law requires the motor-truck driver to reduce his speed to a very low rate when crossing intersecting highways. This provision of the statutes is one of those least obeyed; but few arrests are made for its violation, probably because the law is unknown to police officials.

There can be no question that a railroad crossing a public highway stands in the same relation to the highway as though it were a common highway itself. In fact, a railroad comes within the meaning of the term "public highway" as employed in our motor vehicle laws. Consequently, a motor truck driver is compelled to decrease materially his speed when he approaches a railroad crossing. In most of the States the speed limits at such crossings are from 4 to 6 miles an hour.

Driver Must Not Violate Speed Limits

Violation of the law providing for speed reduction at intersecting highways puts the commercial vehicle driver at fault, at least prima facie, and the fact that he was driving too fast at the time of the accident is a circumstance damaging to him if he should proceed at law for recovery for any injury inflicted. Unless he can prove negligence on the part of the railroad, his case is a hopeless one.

More emphasis should be laid upon compliance with the speed regulations at crossings and in turning corners, for at these places the danger due to fast driving is far greater than that due to driving at 25 miles an hour over a straight, unobstructed course.

It is well settled that a traveler approaching a railroad track is bound to use his eyes and ears so far as there is an opportunity and when, by the use of those senses, danger may be avoided, notwithstanding the neglect of the railroad servants to give signals, the omission of the plaintiff to use his senses and avoid the danger is concurring negligence, entitling the defendant to a non-suit. This rule applies to a passenger in a vehicle approaching a railroad, as well as to the person in charge of the motive power of the vehicle. But, in determining in each particular case whether or not a failure to look or listen was negligence that contributed to the accident, the age, condition and situation of the plaintiff and the existing circumstances are to be taken into consideration. It is not in every case that a failure to look or listen would be negligence, as in the case of a passenger in a street car approaching a railroad track, where the car is entirely under the control and management of those charged with its management, or in the case of a very young child in a conveyance approaching the track.

The rule has been laid down by the United States Circuit Court of Appeals that the duty of a motor vehicle driver approaching tracks where there is restricted vision to stop, look and listen, and to do so at a time and place where stopping and where looking and where listening will be effective, is a positive duty.

"With the coming into use of the motor vehicle new questions as to reciprocal rights and duties of the public and that vehicle have and will continue to arise. At no place are those relations more important than at the grade crossings of railroads. The main consideration hitherto with reference to such crossings has been the danger to those crossing. A ponderous, swiftly moving locomotive followed by a heavy train is subjected to slight danger by a crossing foot passenger or a span of horses and a vehicle; but when the passing vehicle is a ponderous steel structure, it threatens not only the safety of its own occupants, but also those on the colliding train. And when to the perfect control of such a machine is added the factor of high speed, the temptation to drive over the track at terrific speed makes the motor vehicle, unless carefully controlled, a new and grave element of crossing danger. On the other hand, when properly controlled, this powerful machine possesses possibilities contributing to safety. When a driver of horses attempts to make a crossing and is suddenly confronted by a train difficulties face him to which the motor vehicle is not subject. He cannot drive close to the track or stop there without risk of his horse frightening, shying or overturning his vehicle."

Motor Vehicle Easier to Manage than Horse

"He cannot well leave his horse standing by itself, and if he goes forward to the track to get an unobstructed view and look for coming trains, he might have to lead his horse or team with him. These precautions the motor vehicle driver can take, carefully and deliberately, and without the nervousness communicated by a frightened horse. It will thus be seen that a motor vehicle driver has the opportunity, if the situation is one of uncertainty, to settle that uncertainty on the side of safety, with less inconvenience and no danger, and more surely than the driver of a horse. Such being the case, the law, both from the standpoint of his own safety and the menace his machine is to the safety of others, should, in meeting these new conditions, rigidly hold the motor vehicle driver to such reasonable care and precaution as go to his own safety and that of the traveling public. If the law demands such care, and those crossing make such care, and not chance, their protection, the possibilities of motor vehicle crossing accidents will be minimized."

A Traveler Must Use His Eyes and Ears

Where the driver of an automobile could have seen an approaching train at a distance of seven hundred feet if he had stopped before going onto the track, he was held to be guilty of contributory negligence precluding a recovery. And likewise where he drove upon the track without stopping when he could have seen along the track for a distance of five hundred feet.

But in a case in North Dakota, which was an action to recover damages for injury to a motor vehicle at a grade crossing where it appeared that when the machine was near the crossing the gear was changed from high speed to low speed, and the occupants testified that they were listening for the sound of a train, but neither saw nor heard any sign of one, it was decided that they were not guilty of contributory negligence as a matter of law in failing to stop the machine in order to look and listen for an approaching train and a judgment for the plaintiff was affirmed.

Where a flagman is kept at a grade crossing it is decided that even if he is guilty of neglect of duty it will not relieve a commercial vehicle driver attempting to cross the track from the duty of looking and listening.

Activities in the Motor Truck World

Staff Changes in General Vehicle Co.—Chicago and New York Shows—U. S. Motors and Kelly Reorganization—Wells-Fargo Buys Trucks—Affairs of Knox, Pierce, Grabowsky and Gramm Cos.

KREBS BUYS ELMORE PLANT

THE Krebs Motor Co., Clyde, O., manufacturing motor trucks, has recently purchased the plant of the Elmore Mfg. Co., formerly owned by the General Motors Co., Detroit, Mich. B. A. Becker is president of the Krebs Motor Co., and Homer Metzer secretary.

CHANGES IN THE GENERAL VEHICLE CO.

FOR several months past the General Vehicle Co. has been perfecting its organization. An executive circular recently issued by President P. D. Wagoner contains the following additions and promotions: C. W. Squires, Jr., assistant to the president, is made sales manager; Irwin W. Howell is made assistant to the president; G. W. Wesley to be vice-president, vice R. MacLloyd resigned; J. R. C. Armstrong, engineer, electrical division; H. C. McComb, engineer, gasoline division; L. E. Lents, superintendent, electrical division; A. P. Bourquardez is confirmed as district manager, New York sales office; C. V. Riede, of the general sales office, is transferred to St. Louis office, and Geo. Drake Smith to Cincinnati. In addition, the Chicago territory will have at least two new salesmen who have been trained largely in the East and the Philadelphia sales force will also be increased.

"The industry," said President Wagoner recently, "is just beginning to appreciate the dearth of capable motor truck salesmen—men who can produce business under a policy which insures satisfaction to the buyer and justice to the trucks. At first glance one might think that the marketing of electric trucks was the harder problem, but experience indicates there is little difference in selling either kind when they are sold right. In other words, certain standards of salesmanship must be maintained if we would secure reorder business, as that, with a constant supply of new customers, is what builds up confidence in a product."

CHICAGO TRUCK SHOW ALLOTMENTS

SIXTY-FIVE commercial motor vehicle manufacturing companies secured exhibition space at the Chicago show in the drawing held early in October at the New York headquarters. Allotments made at the drawing took all of the ground-floor space in the Coliseum, Coliseum Annex and the First Regiment Armory, with the exception of five of the least desirable spaces, comprising about 2500 square feet in all. Three of these spaces have since been taken and there are in addition half a dozen applicants on the waiting list.

This indicates plainly that next February's exhibition will be considerably larger than last winter's, and in all probability it will be necessary to utilize the basement under the Annex for the first time at the truck show.

There will be no motorcycle section this winter and the center of the second floor of the Annex occupied by it last winter will be filled with motor car parts and accessories, so that this part of the show will be more comprehensive than heretofore. Most of the members of the motor and accessories manufacturers will continue their displays from the first to the second week, and there will in addition be many sundries displayed by unaffiliated concerns and businesses.

In the complete list of vehicle makers already allotted space are ten that are new exhibitors in Chicago. These are the Brown Commercial Car Co., Buffalo Electric Vehicle Co., Four-Wheel Drive Auto Co., Gramm-Bernstein Co., Krebs Commercial Car Co., Lippard-Stewart Motor Car Co., D. F. Poyer & Co., Standard Motor Truck Co., Transit Motor Truck Co., and Universal Motor Truck Co.

Of these, only the Lippard-Stewart and Universal showed in New York last winter. The Brown Co. is the new concern organized by Will H. Brown, who was formerly of the Mais truck, which was exhibited in the Chicago show in 1910. The Gramm-Bernstein is the new enterprise of B. A. Gramm, whose Gramm Motor Truck Co. was sold to the Willys-Overland Co.

It will be noticeable next February that the large companies have extended their lines and are offering a wider range of capacities than formerly, and in some cases added electric vehicles to their gas truck lines or gas trucks to their electric lines.

KISSELKAR FACTORY AT MILWAUKEE

WORK in renovating the recently acquired auxiliary plant of the Kissel Motor Car Co. at Milwaukee is reported to be progressing rapidly, and it is expected that it will be ready for occupancy very soon. The improvements and additions to the Kissel plant at Hartford, Wis., are nearly completed and already partly in use. New KisselKar service buildings in Chicago and St. Paul are also nearing completition, while the Boston building, situated on Commonwealth avenue, is now open.

NEW YORK ANNUAL MOTOR SHOW

ALLOTMENT of spaces for the Annual Automobile Show to be held this winter in New York for 2 weeks in the two buildings, Grand Central Palace and Madison Square Garden, were made at the headquarters of the Automobile Board of Trade recently. There were eighty-seven applications for space from automobile manufacturers and four hundred and three applications from accessory manufactourers, assuring a record-breaking exhibition that will surpass any previous exhibition held in this country. Commercial vehicles will be shown the second week.

U. S. MOTORS REORGANIZATION

THE President of the United States Motor Co., Benj. Briscoe, has announced his retirement, to take place after the middle of November. The resignation followed on the adoption of the reorganization plan by creditors. The U. S. Motors reorganization plan has been decided upon with the possible exception of a few minor details. The plan provides for the equitable protection of all parties at interest and works out to the advantage of both the present preferred and the common stockholders. While the company is now in the hands of a receiver, the receivership is a friendly one and is for the sole purpose of legally conserving the assets of the company in the interest of all concerned.

The present company will be sold to a new company, which will have a capitalization of about $28,000,000 par value. The new company will have three classes of stock, $10,000,000 first preferred 7 per cent. cumulative stock, $8,000,000 second preferred 6 per cent. non-cumulative, and $10,000,000 common. There will be no bonds or debentures, and no fixed charges of any kind.

The present obligations of the company, amounting to about $12,000,000, will be taken care of as follows: The $6,000,000 outstanding debentures will be exchanged for new stock; $4,000,000 notes held by banks will be exchanged for new stock; merchandise bills amounting to about $2,000,000 will be paid in cash.

Present stockholders will be permitted to exchange their holdings for stock in the new company upon payment of $22.50 a share on their old stock. The proceeds of these subscriptions will amount to approximately $5,500,000. The subscriptions will be underwritten by prominent New York bankers.

SALES CONVENTION AT INDIANAPOLIS

THE general sales convention of motor car dealers was held at Indianapolis, Ind., on October 8, and was attended by 400 dealers and advertising agents. As a result of the convention a permanent organization has been formed under the title of the General Automobile Sales Association, handled by a committee consisting of the following: J. J. Cole, Indianapolis; Homer McKee, Indianapolis; H. M. Swetland, New York; E. Le Roy Pelletier, Detroit; John C. Wetmore, New York; Hugh Chalmers, Detroit; Roy Chapin, Detroit; William Boyd, Chicago; Carl Page, New York; C. B. Means, Cleveland; J. L. Mahin, Chicago; H. L. Stratton, New York; John Guy Monihan, Indianapolis, and F. B. Stearns, Cleveland, appointed in a resolution introduced by Francis L. Wurzberg, general manager of the Class Journal Co.

At the convention, among several others, J. G. Jones spoke on "Headwork in Salesmanship"; J. L. Mahin, of "How to Use Advertising in the Retail Game"; H. G. DuPree, on the topic of service; W. H. Boyd, on "Salesmanship and Advertising." The opening address was delivered by J. J. Cole.

WELLS-FARGO A TRUCK BUYER

AFTER eight months' careful investigation of motor vehicles the Wells-Fargo Express Co. has begun the purchase of gasoline trucks. It has purchased seven three-ton trucks, of which five were Peerless trucks.

A report that the company had placed a block order for 100 trucks with a single company is misleading, for they did not place an order for that number, the total number of trucks purchased by them being twenty-six, seven of which were of three-ton capacity, and the balance of smaller capacity.

It is stated officially that the company is not in the market for more trucks at present and has not contemplated the purchase of 100 at all. These trucks will be scattered about among the company's offices in New York, Chicago, St. Louis and San Francisco.

REORGANIZATION OF THE KELLY CO.

THE directors of the Kelly-Springfield Motor Truck Co. met in Columbus and completed the organization plans of the company under the increased capitalization. Negotiations by which the business of the old Kelly Motor Truck Co, Springfield, is taken over by the new organization were completed and plans announced for a wide increase in the capacity of the plants. The new capitalization will be divided $1,000,000 of common and $1,500,000 of 8 per cent. cumulative preferred stock; $510,000 of the common stock will be issued at once and $800,000 of the preferred shares, making the total outstanding capital of $1,310,000. Emerson McMillin & Co., who are financing the reorganization, offer the preferred stock at the net price of $105 per share, with the right to subscribe to the common stock, not to exceed 25 per cent. of the preferred subscription, at half of the par value. Of the stock to be immediately issued $219,875 of the common and $219,875 of the preferred will be used in the acquisition of the old company; $676,833.33 of the new capitalization will go into the treasury, to be used in discharging obligations of the Kelly Motor Truck Company, assumed by the new company. It is announced that in the organization of the new company no stock is issued for promotion purposes. Charles T. Shanks has been engaged as sales manager of the newly organized company. Mr. Shanks has acted for some time as sales agent for the Kelly Co. on the Pacific Coast, and he was actively identified with the Winton interests for many years; he is well known as one of the foremost automobile distributing experts in the business.

FEDERAL CHAIN CO. MAKES NEW GRIP

THE Federal Chain Mfg. Co., Springfield, Mass., manufacturers of traction grips for all types of commercial motor vehicles equipped with solid tires, has purchased all rights to manufacture Gaylor Grips from the Atlas Chain Co., Brooklyn, N. Y. The company is also increasing its lines by the addition of a new type of grip, to be known under the name of Federal.

CASE CO. BUYS PIERCE MOTOR CO.

THE J. I. CASE THRESHING MACHINE CO, has purchased the entire assets and good-will of the Pierce Motor Co. and has assumed its liabilities. The factory will hereafter be known as the motor works branch of this company.

SITUATION OF THE KNOX CO.

THE following statement has been received by THE COMMERCIAL VEHICLE from E. O. Sutton, trustee of the Knox Automobile Co., Springfield, Mass., relative to the financial condition of that company:

"Regarding the present situation in the Knox Co., would say that it has continued business without a break and we intend that it shall do so permanently. It is under somewhat different management than previously. Business has come in surprising volume the past month and the prospects for the future look brighter than ever before.

"The heavy drain caused by the large amount of experimental and development work done in the last two years was the financial problem, but the resultant development of the product we believe will be felt in the present year and years to come."

GRABOWSKY CO.'S AFFAIRS

THE Central Trust Co., Illinois, has been appointed ancillary receiver of the property in New York City of the Grabowsky Power Wagon Co., Chicago, Ill., by Judge Hand in the Federal Court, New York, and by Judge Landers, of Chicago, on the application of Morris Moyer, creditor, for $3,000.

GRAMM CASE SETTLED

THE litigation in connection with the Willys-Overland Co. and the Gramm Motor Truck Co. has been settled out of court by readjustment of values which apparently are satisfactory to Mr. Willys. Mr. Willys alleged in his complaint that the values shown in the statements under which he purchased the stock of the Gramm Motor Truck Co. from A. L. White and W. T. Agerter, formerly president and secretary, respectively, of the Gramm Motor Truck Co., were not correctly represented, and sued for a rescindment of the purchase contract.

Trade Conditions Throughout the Country

A Summary of the Position of the Motor Truck Industry In the Principal Cities of America

A GREAT increase in the sale of commercial vehicles during the month is reported by New York City dealers; merchants generally are becoming alive to the advantages of motor delivery. As a rule business is at an ebb at this time, between the summer's steady sales and the spring rush.

MOST of this business seems to consist of repeat orders, but a steady growth in purchases by the smaller firms is evident. One company reports orders from a mail hauling company in anticipation of the parcels post system and inquiries received from the government are also reported.

PHILADELPHIA, PA.—The approaching election is having some effect on the commercial vehicle industry. But for this holding back upon the part of the more timid buyers, however, the state of the local motor truck field would be one of unusual activity. Sales are good; prospects are better. Quantity buying is not conspicuous, but single cars are being sold. There have been no municipal sales. The Ford Motor Co., which for the past 5 years has been located at No. 250 North Broad street, will in the near future move to larger quarters at Nos. 257-259 North Broad street. The company has also leased property at Sixteenth street and Washington avenue for the purpose of establishing an assembly plant there, with a private railroad siding. The Lingstreth Motor Car Co., handling the Alco truck, will remove about November 15 to the new sales and service building at Nos. 2126-28-30 Market street, and the Lozier Co. has taken a long-term lease on a property at the southwest corner of Twenty-first and Ludlow streets, where approximately $40,000 will be spent in reconstructing the present building into a sales building. The Service Motor Co., which features the Service friction drive truck, comparatively a newcomer, has during its 6 or 7 months' residence here dotted this State and New Jersey with agencies.

Increase of 30 Per Cent. in New Orleans

NEW ORLEANS, LA.—Another big cotton crop was all that was necessary to assure a winter of unparalleled prosperity. It has resulted in the placing of many orders for commercial cars. October business shows an increase of 30 per cent. over that of the corresponding month a year ago and an increase of 12 per cent. over the sales of last month. With the exception of the motorization of a dairy company and the purchase of a hearse, embalmer's wagon and 10 specially built funeral coaches, the sale of motor vehicles has been scattered among a variety of lines of commercial activities.

Municipal purchases during October were confined to further motor equipment for the fire department. No further purchases of apparatus for animal traction are to be made. Delivery has been made of an automobile sprinkling wagon, purchased by the city.

Selling Situation in Syracuse Improving

SYRACUSE, N. Y.—The reports of truck dealers and representatives agree that the selling situation in Syracuse is improving. During the past 2 months a marked change has been perceptible in the situation in that the demand is increasing for the heavier vehicles. The light delivery trucks have been a strong factor locally for some time, but the heavier machines did not make a correspondingly good headway. Now, however, the possibilities of these vehicles are better understood and a number of the heavy trucks are listed for fall deliveries in Syracuse and vicinity. The dealers say that the business for October was distinctly better than that for September and that it is far better than at the corresponding time last year. The outlook for the future is considered of the best.

The truck exhibition at the annual motor show to be given in the Armory here next spring, it is stated by dealers, will be bigger than ever, since the number of agencies has increased and more space will be required.

A Good Tone in Minneapolis

MINNEAPOLIS, MINN.—Motor truck sales here show a good tone according to most of the branch managers because, although it is the start of the slack season, the sales continue as good as last month and better than a year ago. Just now the principal sales are being made to retail and wholesale dealers of all classes, trucks sold ranging from 1 to 3 tons. Light deliveries are having a good sale and the postoffice department is experimenting in the Twin Cities as to the efficacy of the motor car for collection as compared in efficiency and time and cost expense with the usual horse wagon service. One reason for the good outlook locally is that the coal men and contractors are studying the truck system, largely because of the teamster strike in the coal trade, and the possibility of its extension to other lines, such as excavation. The coal men heretofore have believed that the truck would not do. Even the ice men are talking over the truck business. The Minneapolis Sanitary Ice Co., which is to begin making ice December 1, will deliver with trucks. The Northwestern Fuel Co. is experimenting with the truck for coal delivery and has in service a 5-ton Pierce-Arrow and a 3-ton White.

Prospects Favorable in Austin, Texas

AUSTIN, TEX.—It is stated by local motor car dealers that while they have made no sales of motor trucks in Austin during the last month, prospects are favorable for a considerable trade in this line during November and December. Some of the larger wholesale houses and manufacturing plants contemplate installing a full line of motor trucks to handle their city traffic. No municipal purchases of motor trucks are in contemplation just now.

According to information received from dealers in San Antonio the motor truck sales have shown a wonderful increase in that city during the last 2 or 3 months. To a somewhat lesser degree there has also been an increase of sales in Dallas, Houston and Fort Worth. Generally speaking, prospects of the motor truck trade in Texas are considered to be very promising.

Richmond Shows Unusual Activity

RICHMOND, VA.—The automobile truck business here is showing unusual activity. The number of sales for the past month have exceeded the sales of the same period last year by at least 40 per cent., and inquiries are many. During the last 12 months grain dealers and millers, hardware dealers, iron works and storage houses have added auto trucks to their delivery forces, discarding horses and mules as motive power. During September and early October the sales have shown an increase over July and August.

On February 12-23, next year, Richmond will give her first automobile show in the Horseshow Building, which has a floor capacity of 13,000 square feet. Trucks and every other product of the automobile factories of the country will make up the exhibits.

No Large Purchases at South Bend

SOUTH BEND, IND.—During the present season there have been no large purchases of motor trucks in the territory of northern Indiana and southern Michigan covered by agents out from South Bend; however, the business of both the present month and year have been better than last month and last year, and the outlook for the future business is considered very good by the truck dealers. There will be no truck exhibitions in this immediate territory this year. At a recent meeting of the Common Council it was voted to expend $6,500 for a hook and ladder truck for the fire department. The principal class of business buying trucks at this time has been the wholesale, the capacity of the trucks ranging from 1 to 2 1-2 and 3 tons.

Miners Use Trucks in Arizona

PHOENIX, ARIZ.—More trucks are being sold and used in Arizona than ever before in the history of the state. A year ago the number of trucks in use was negligible, but during the last twelvemonth a great many mining companies have displaced horses and mules for the gasoline wagons.

Most of the trucks in Arizona are used by the mining companies. Some few are used in the cities and farmers, particularly the dairymen, are finding the truck a money-saver. It makes it possible to conduct dairies at greater distance from the creameries and skimming stations, for the milk can be marketed before it sours.

The greatest demand is for trucks of 3 to 6 tons capacity. The 5-ton truck is a general favorite. Some of the mines, however, have trucks with a capacity as high as 10 tons. For the transportation of ore and coke it is necessary that trucks have dumping bodies.

From month to month, since the beginning of 1912, the demand for trucks has shown a steady increase. It is apparent that the demand has not reached its height and it probably will not do so as long as the price of copper maintains a reasonably high level.

Wilmington Truck Parade

WILMINGTON, DEL.—Truck dealers here have made no large sales in the last month, but several have made small sales. The conditions are about the same as during the preceding month, and about 25 per cent. better than a year ago. Recently there was an industrial parade, which required about 2 hours to pass a given point, and in it was nearly every commercial truck in the city, as well as many other features, while many of the trucks were also in a general motor parade on the following night. The result of this was that the public learned with amazement of the extent of the truck business here. It acted as a stimulant, and numerous inquiries followed. No immediate municipal purchases are contemplated, but it is probable that a motor hook and ladder truck will shortly be added to the fire department equipment. Small businesses, so far, have been the principal users of trucks, the average capacity of trucks in use being 1½ and 2 tons.

One of the Best Months in Columbus

COLUMBUS, O.—Dealers in motor trucks here are united in saying that the month just past has been one of the best in years in the motor truck industry. Inquiries have been very numerous and sales are frequent. The principal lines buying motor trucks are furniture houses, and wholesalers in practically all lines. During the past month the feature has been the demand for the heavier style of trucks, ranging from 2 tons upwards.

Compared with a month ago business is more active, while comparing with a year ago trade is about 50 per cent. better. While it is not considered the best time of the year to sell motor trucks, still trade has been holding up exceedingly well. The future outlook is considered bright in every respect.

The superintendent of the Water Works Department has started a movement to purchase motor trucks for the use of the department in hauling heavy pipe and castings, and an ordinance will be introduced in the city council for an appropriation for that purpose.

Inquiries from Findlay Agriculturalists

FINDLAY, O.—Local dealers all report that this coming season will see the first farmer of the northwestern district trying out the motor truck. Many inquiries have already been had from agriculturalists, and that quite a few sales will be made in this direction is predicted as more than a probability. As compared with the business of last year, the sales of the motor vehicle to commercial and business men have increased fully 100 per cent. Dealers who have been running two, three and four wagons have discarded them for the motor. The general model truck is that of the 1-ton variety, as one most adapted to the average country streets, although factories are buying 3 and 4-ton trucks.

Nebraska Brewers and Grocers Are Buying

OMAHA, NEB.—Although the motor truck industry has not yet fully developed in Nebraska, the demand for trucks as a means of transportation is gradually increasing and this demand is most noticeable in the lines of breweries, wholesale houses and large groceries. The breweries have come in for the largest share during the past month and as many as ten trucks have been sold in Omaha to them alone.

The amount of business for the last month as compared with the previous month has not increased, but for the same time as compared with last year there has been a decided increase.

The Annual Automobile Show, which takes place some time next February in Omaha, will be the beginning of big business in the motor truck lines, say the local dealers. The trucks are one of the most important displays in this show.

The U. S. mail department is now considering the taking of bids for auto trucks which are to be used to deliver and pick up mail. The only drawback to its purchasing several of these is the amount of money which will have to be expended, and if this is not too large Omaha will have the first of these in Nebraska.

Two and 3-ton capacity trucks are about the only kind wanted in Nebraska. The reason for such light cars is principally because of the many hills in which Nebraska abounds and the rushing business which demands speedier, rather than slower and heavier, cars.

The Ward Bread Co.

One Hundred 1,000-Pound Electric Vehicles for City Delivery of One Branch—Well-Organized System

The cost of each electric vehicle amounts to $1.028 per day and to $.0466 per mile. Garage superintendent oversees inspection repair, washing and battery departments.

THE Ward Bread Company, Brooklyn, N. Y., is among those companies that have come to recognize the great value of the employment of a fleet of electric commercial vehicles in city delivery. And not only has it recognized the success of such an installation, but it has gained an immense advantage over the general run of electric vehicle owners by keeping a regular account of the cost of maintenance and operation of its fleet of trucks. The vehicles were supplied by the Ward Motor Vehicle Company, and this company was authorized to assume full charge of the work at the Bronx plant of the bread company. The delivery equipment at this branch comprises one hundred 1,000-pound wagons, all of the same design. They are fitted with double doors at the rear, the sides and floor are lined with galvanized iron and a set of sliding doors at the rear of the driver's seat affords ready access to the main part of the vehicle.

Good Arrangement of Shipping Department

The shipping department of the Ward Bread Company, including the garage, occupies the main floor of the bread plant. This is an admirable arrangement, as loading platforms, shipping department offices and garage are all situated close to one another, this arrangement minimizing the amount of time taken over the operation of dispatching goods. The loading platforms are designed in as compact a form as possible and the cleanliness of the passageways is remarkable owing to the absence of horses. The operating equipment comprises a battery, repair and charging room, and the arrangement of the charging board makes the handling of many vehicles simplicity itself. Even when all the vehicles are on charge at one time one man can make the proper current adjustments.

The organization of the whole delivery system has been simplified down to a fine point. Under the garage superintendent are the inspection repair department, washing and polishing department and the battery charging and repair department, over each of which there is a foreman. Three sets of records are kept, namely, a daily vehicle report card, a 5 weeks' report card and a parts renewal card. The first of these is used daily by each vehicle operator. A clean record card found in a pocket in the front of a vehicle indicates that the machine has been properly inspected, repaired, washed and charged. All accidents have to be reported on this card. At the end of the day the card is turned in to the superintendent. The vehicle is turned over to repair men if necessary, and from thence to the washing department and finally to the charging department, where it is charged and made ready for duty for the following morning. As every cost item is entered on the daily record the total cost represents the operating cost for the day. Every possible item has a place on these cards.

Fleet of Electric Vehicles in the Service of the Ward Bread Co., of New York City

Avery 3-Ton Truck in the Service of Stacy & Sons, a Large Fruit and Grocery Wholesale Firm of Minneapolis and St. Paul

The 5 weeks' report card contains all the information relative to each vehicle for that period. On the parts renewal card are recorded the vehicle specifications, factory number, date put in service, dates on which tires, bearings, batteries and other wearing parts were replaced, thus giving a correct idea of the service obtained from these parts.

The books are closed every 5 weeks and the costs cover the entire operating expenses, except interest and depreciation, on the whole fleet of one hundred vehicles. It should be mentioned that the 5 weeks' report contains the number of miles covered by the vehicles so that one is enabled to figure out the cost per mile of running each vehicle.

Some interesting figures have resulted from these records. During a period of 5 weeks a total of 66,023 miles was traveled, or an average mileage per car of 22 miles per day. The total car cost was $597.63, or 99 cents per day per car, an average cost per mile of .009 of a dollar. The total accident expense was $84.65, or $.0182 per car per day, which works out to a cost per mile of $.00083. The total repair cost, including all items of expense in connection with garage, etc., amounted to $2,400.50. Thus, the cost during 30 working days amounted to $3,082.78 as the cost of operation of 100 electric vehicles, exclusive of interest and depreciation.

Truck in Fruit and Grocery Business

STACY & SONS, of Minneapolis and St. Paul, a large fruit and grocery wholesale firm, in summer and during the busy season handle from thirty to fifty cars of goods per day. The bulk of this business is handled on their motor truck equipment, which consists of an Avery 3-ton truck, two Avery 2-ton trucks and two lighter cars.

The 3-ton Avery is used largely in making trips between Minneapolis and St. Paul. It frequently makes two round trips of over 27 miles each in a day and several short trips besides. The truck is often started out for St. Paul at 5 in the morning and is back in Minneapolis by 7.30. In this way it gets the early morning market. The 3-ton truck takes the place of three teams regularly and handles the loads at an average of about 5 cents per ton mile. It costs Stacy & Sons $3.50 a day to run one team, while a truck doing three times the work is operated for a little better than $6.

A New Bus Service

Indianapolis Has Recently Installed a Fleet of Seven Motor Buses Which Are Operating Successfully

The buses are White cars and are fitted with Goodyear solid base tires. About 10 gallons of gasoline are consumed per day per car. The buses have a private garage.

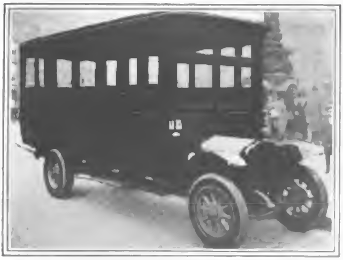
A MOTOR bus service has recently been installed in Indianapolis, Ind., this being the first of its kind in the city. The distance at present covered by the service is 3½ miles, through the best part of the city, over wood pavement or asphalt all the way. There are seven cars in service, six regularly and one at rush hours. The cars were built by the White Company, Cleveland, Ohio, each with a 4-cylinder, 30-hp. gasoline motor. Bodies are inclosed and a seat runs lengthwise on each side of the car, with a driver's inclosure in front. The pay-as-you-enter system is employed. The entrance is directly back of the driver and the exit through a door in the rear. When the door is opened a step is unfolded. A system of call or signal bells for the use of passengers is attached, operated by dry cells. A storage battery lights the car and the headlights. Oil sidelights are employed; the car is heated from the exhaust in the winter. Each car seats twenty-two passengers and there is standing room for eight passengers.

Buses Operated by Fourteen Drivers

Each machine consumes daily about 10 gallons of gasoline. Sewell cushion tires with Goodyear solid base tires are used. The cars are kept in a private garage. Fourteen drivers on 8-hour shifts are required to operate the cars. In the garage two mechanics and one washer are employed. In the company's office one man is employed, and these form the sole employees.

The garage is a brick building measuring 80 by 80 feet, one story high; the roof, which is fireproof, is supported by steel columns. There is a 500-gallon underground, water-pressure gasoline tank and the garage is equipped to make all repairs.

At the present time the company is contemplating starting an additional line which will necessitate the purchase of eight more buses. A crosstown service is being considered.



One of the Fleet of Motor Buses Operating in Indianapolis

Martin Tractor at Work Drawing Timber in San Francisco

Motor Truck for Drawing Timber

A GOOD demonstration of motor truck efficiency was recently made in San Francisco when one of the Knox Automobile Co.'s "Martin" tractors drew two sticks of timber, each 90 feet in length and 20 inches square, through the city streets. The total weight of the lumber was 10 tons, and the total length of tractor and load 102 feet. The tractor, being able to make sharp right-angle turns, had no difficulty in rounding the corners and working its way through the traffic.

Lumber merchants have been waiting a long time for a motor truck which could be lengthened or shortened to suit the length of the timber to be drawn; also some method which would allow the motive power to be kept busy while the load carrying part was being loaded or unloaded. In the lumber business more time is consumed in loading and unloading than in actual hauling.

Electric Truck Co.'s Figures

TWO electric trucks are owned by the Gas & Power Cos., respectively, in Saginaw. The one used by the Gas Co. as a meter and service truck is a 1,000-pound truck, and the one used by the Power Co. as a service and line repair truck is a 2,000-pound truck, both of them being manufactured by the Argo Electric Vehicle Co., of Saginaw. The smaller truck has been in operation since June 12, 1911, and has been used in connection with extensive pole and line work that has been done. The work was found too heavy for such a light truck, however, so an additional truck, the 2,000-pound one, was purchased, and the light truck transferred to the Gas Co., taking the place of two horse-wagons.

From the day the first truck was put in operation a record has been kept showing the number of miles traveled each day and the amount of time that was spent during the day in idleness, or when the truck was standing still.

It was found that the maintenance cost of the truck was greater than that of a horse and wagon, but that a considerable saving was effected in wages, those paid for horse and wagon operation being far heavier. Thus, operating expenses of the truck show a saving of nearly 50 per cent. This means, in this special case, a yearly saving of nearly $1,000. The following table shows detailed expenses, etc.:

Number days of truck operation	94	days
Number hours of truck operation	199.4	hours
Average number hours per day operation	2.12	hours
Total number miles traveled	2009	miles
Average miles traveled per day	21.4	miles
Maximum miles traveled per day	53.5	miles
Average miles traveled per hour	10.08	miles
Total K.W.H. used	768	K.W.H.
K.W.H. used per day	8.17	K.W.H.
K.W.H. used per mile	0.38	K.W.H.
Energy cost per mile at 5c per K.W.H.	$ .0190	
Battery renewal and repair cost per mile	.0314	
Mechanical repair cost per mile	.0090	
Tire renewal cost per mile	.0150	
Total operating cost per mile	.0744	
Total operating cost per day	$1.5900	

Special Army Truck

Design for a Motor Truck for Military Use Submitted to the War Department, Washington, D. C.

Many interesting features are contained in this design by Major H. J. Gallagher, of Seattle; it is estimated that one freight truck would be sufficient for four companies.

DESIGNS for a gasoline-propelled motor truck for military service exclusively have been drawn by Major H. J. Gallagher, of Seattle, and are now in the office of the War Department in Washington, D. C., for consideration. Many features are included in the conveyance conceived by the Seattle army officer that recommend it strongly as a future means of transporting troops, guns and ammunition. It is superior to many models of motor trucks intended for military use in that it makes provision for carrying rifles, shells and ammunition in addition to accommodating fourteen men. Clothing and ration space also is included in the design of the car, as can be seen from the diagram below.

An interesting feature is that the construction of the machine permits all the men to mount and dismount at the same time, obviating the delay and confusion that might be experienced in the cars where a single means of access is provided.

The gasoline tank has a capacity of 80 gallons, which will give the car a traveling radius of 400 miles, while a reserve gasoline supply can be carried conveniently. A tank for drinking water for the soldiers is included in the equipment of Major Gallagher's machine. This is detachable, making it convenient to remove it in case the car is carrying excessive weight.

The speed possible for the automobile is estimated at 30 miles an hour. On ordinary roads it should cover 15 miles an hour, with a day's mileage of approximately 100 miles, which is equivalent to 4 days' march for cavalry and at least 5 days' tramp for infantry.

Germany has adopted the scheme of having an auto division in her army and has found it wonderfully efficient. That the United States ought to maintain a squadron of motor vehicles for military use is the firm conviction ot Major Gallagher.

The cost of a machine as designed is based upon an estimate of a practical automobile man, the estimate being $2,000 each for cars for troops, $1,200 for a machine for officers and $1,800 for a freight truck. Assuming that a large number of cars would be purchased under a contract, the cost probably would be less.

The machine is designed to carry in the lockers under the seats, which are placed back to back lengthwise of the auto, such articles and extra clothing as are now usually carried on men's backs. There is also space under the legs of the men where shelter tents and other equipment could be carried. The ration cabinet is capable of carrying 3 days' rations for fourteen men.

It is estimated that one freight truck would be sufficient for four companies in addition to the space for carrying freight on the machine. This truck would be of 6,000 pounds capacity.

As to the questions of expense and convenience, Major Gallagher has prepared figures which would make it appear that the adoption of the automobile as a means of transporting troops and ammunition would be a step toward economy, in addition to greater dispatch than is possible by horse and mule.

Cost figures for transporting 140 men 100 miles by cavalry and by automobile show a saving of $7,000 on equipment, while a healthy saving is noticeable in favor of the automobile as against the horse and mule for food. A vital point in favor of the automobile is that there is not one cent of expense attached to it while the car is idle.

Drayage Rates in San Francisco

SPEAKING recently with regard to drayage rates and motor truck service in San Francisco, Mr. Cronninger, sales manager of the Speedwell Co., said: "After careful analysis first of the current drayage rates, I found them very high by comparison. I find the horse-drawn drayage rates not always predetermined by mileage, but by custom. Where long hauls are necessary special arrangements are made between drayage companies and merchant. I figure that approximately ten million tons were moved in San Francisco in 1911. The average haul is approximately 1¾ miles (including return empty or ⅞ mile load). The average price paid per haul by horses is $1.08 per ton, equivalent of .617 per ton mile. In fact there does not seem to me a thoroughly established rate and I can readily understand the causes.

"I feel certain that on account of the wharf or depot condition that 70 per cent. of a drayman's time is lost in collecting his cargo according to his receipt sheets. In one shipment received of 32,000 pounds of the same material I noticed that it was scattered in five different places in one freight depot. This necessarily required great care, patience and time to collect in order that the Drayage Co might collect their load. This time lost is costly to the merchant and naturally the drayage company must receive revenue for delays of this kind beyond their control."

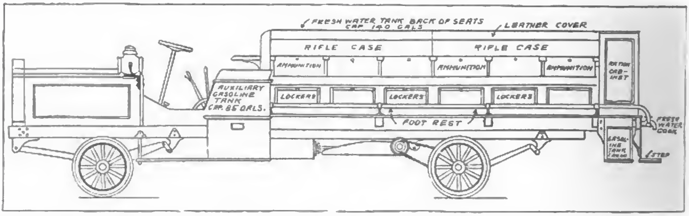


Diagram Showing Side Elevation of the Army Truck Designed by Mayor H. J. Gallagher, of Seattle, and Submitted by Him to the Authorities at Washington, D. C.

The Gasoline Vehicle

Reports from Dealers with Regard to Motor Truck Sales from September 15 to October 15

There seems to be a general good prospect for the winter and spring sales, although the unsettled state of the country prevents the clinching of any definite deals.

GENERAL business conditions during the period from September 15 to October 15 have been somewhat influenced by the forthcoming Presidential elections, and this uncertainty of atmosphere has been reflected on the motor truck industry. Notwithstanding, however, the hesitancy of some buyers that has been experienced by several manufacturers and dealers, generally speaking the period mentioned has been better than the corresponding period of last year. This is no doubt due to the trend of thought that is being gradually introduced into the merchant's mind that horse traction is a thing of the past and that to keep progressive and up-to-date every man must reform his methods of delivery to conform to the spirit of efficiency that is absolutely an essential part of the makeup of the modern commercial and business world.

With these signs of increasing energy in the motor truck industry, the manufacturer should begin a closer study of the wants and particular requirements of the individual merchant. There are many industries which have not yet seen fit to adopt the motor truck as a means of delivery, yet undoubtedly they will eventually do so when the right vehicle comes along. There are certain body designs to be modified, certain doubts to be met with regard to tires and capacity that will have to be answered in a manner suited to each industry. Also the manufacturer must work for the reform of loading and unloading facilities, the preparation of good streets in cities and the macadamizing of inter-city highways. Once the merchant recognizes the fact that the motor truck manufacturer is the man most able to assist the prosperity of general business conditions, he will look for the reason of that power, and will find it in the commercial vehicle.

Alco Models All in Demand

THE AMERICAN LOCOMOTIVE COMPANY, New York City, states that there has been a general increase in the truck business throughout the country during the above-mentioned period. The demand has not been for one particular size of truck, but has been for all models. Among the orders for more than one truck is that received from the New England Coal & Coke Company, Boston, who has purchased three trucks.

THE KNOX AUTOMOBILE COMPANY, Springfield, Mass., is particularly gratified with the reception which the Knox Martin tractor is meeting with and many orders have been received for this tractor from all classes of business. The tractor seems to be particularly well fitted to the coal and lumber interests, and the largest number of orders is received from these lines. Prospects look good for the winter in all lines of commercial work, including fire and civic vehicles. There has been a large number of repeat orders and this tendency seems to be with all the large companies who have given motor trucks a thorough trial within the past few years, this fact proving conclusively that those who have experimented the longest have found the motor truck indispensable.

The period from September 15 to October 15 has been a particularly good one with the GRAND RAPIDS MOTOR COMPANY, Grand Rapids, Mich., and has brought many inquiries and sale leads. One large sale made in the period mentioned was one of forty trucks for export, sold to a French house in Paris. The company makes the 1 1-2-ton truck only.

The VELIE MOTOR VEHICLE COMPANY, Moline, Ill., says that there seems to be a better feeling toward the commercial vehicle during the last 30 days, especially in the outlying districts of Chicago. Manufacturers are beginning to believe, and it has been proven to them, that there is profit in the use of the commercial vehicle, but they still hesitate and they have good reason for doing so here on account of poor streets and traffic conditions for vehicles operating within the loop district of Chicago. The company believes that there have been more orders placed recently for commercial vehicles than in any corresponding month in the past.

The outlook is very good for a large winter business according to the A. O. SMITH COMPANY, Milwaukee, Wis. The company is now selling machines for spring delivery and finds there is an especially large demand for 5 and 6-ton trucks. The company builds nothing lighter than 2-ton trucks.

Sanford and Locomobile Business Healthy

The SANFORD MOTOR TRUCK COMPANY, Syracuse, N. Y., finds that its business has increased during the period mentioned, although such increase was not expected.

The motor truck business seems to be in very healthy condition according to the LOCOMOBILE COMPANY, Bridgeport, Conn., which is building a 5-ton truck only. As far as can be seen the company considers that there is every reason to expect a prosperous winter.

Owing to the decided improvement in general business conditions, the MERCURY MANUFACTURING COMPANY, Chicago, Ill., has remarked a great improvement in the commercial car business. Prospective purchasers who 60 days ago were complaining of poor business and slow collections, are now buying cars and are looking forward to a prosperous winter. In fact there has been a greater activity in the commercial car business during the past 6 weeks than of any similar period during the last 2 years; the merchant is beginning to appreciate the advantages of the motor car over horse-drawn equipment and indications are that by next spring the demand for commercial cars of all rating will exceed the supply, and the manufacturers will find it difficult to fill orders.

With the INTERNATIONAL MOTOR COMPANY, New York City, there has been very little change in the situation of the industry during the past 30 days. Probably there is not quite as much enthusiasm on the part of the merchants to buy motor trucks just before the eve of the elections. The company thinks that some sales are being held up for the reason that just before nearly every national election there is a feeling of indecision and expectancy as to the outcome and business men are deferring their purchases until after the period of doubt.

Elections Are Affecting Business Deals

The same opinion is shared by the COUPLE-GEAR FREIGHT-WHEEL COMPANY, Grand Rapids, Mich., who says that inquiries were not so flattering during the period from September 15 to October 15 as during the 3 months prior to the first date. It was hoped that the Presidential election would not bring about any hesitancy on the part of buyers, but this has evidently not been the case. It is presumable, however, that the inquiries will be better during the coming month.

The biggest business in the experience of the Adams Bros. Company, Findlay, O., has been done during the above-mentioned period. From the present large number of orders booked ahead not much idleness is anticipated this winter.

MUNICIPAL SERVICE EXTENSIONS

Vehicles In Europe

Types in Municipal Service in Germany, France and England Used for Street Cleaning and Refuse Collecting

THE use of motor-propelled vehicles in municipal service is increasing year by year not only in number but in variety. All branches of municipal service are beginning to see that the motor vehicle is the most economical solution to every municipal problem; not only are motor vehicles being used in the fire department, but in the street-cleaning department, road-repairing department, road-constructing department and snow-removing department. Vehicles are now being designed so as to be specially fit for each kind of service. Especially so is this the case in Europe, where the municipal authorities in such large cities as Paris, London, Berlin have adopted motor-propelled vehicles for the services above mentioned.

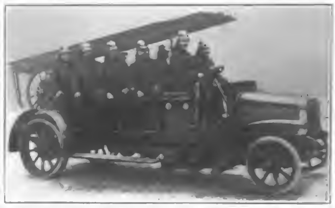
Adler Fire Engine in Germany

With regard to fire-fighting apparatus in Germany, the Adler engine is a favorite. The accompanying illustration shows a 40 to 50-h.p. 4-cylinder Adler pumping engine in use at Frankfürt-on-Main. In general appearance the Adler engine does not differ very much from standard practice, excepting the position of the pump, which is situated amidships. This fitting has a maximum pumping capacity of 2,000 litres per minute, while the motor is running at 1,600 revolutions a minute and developing 47 horsepower. The chassis itself is of a type which will carry up to 2 tons, this being necessary from the fact that some of the Adler fire brigade types carry in addition to the ladders, four reels of hose, two behind and two down the center of the body between the crew. In spite of this the vehicle in service is tolerably speedy for a 4-cylinder machine, it having covered at times 1,250 metres in 4 minutes, and this with metal wheels and solid rubber tires.

Very important reforms are in progress in Paris in connection with street cleaning and the collection of household refuse. The municipal authorities have recently taken delivery of about fifteen vehicles of various types respectively designed for street sweeping, sweeping and watering, and watering and washing.

Street-cleaning Apparatus in Paris

For street-cleaning purposes four distinct types of vehicles have been ordered: Motor-driven street sweepers; sweepers having a spraying jet to prevent dust; combined sweepers and watercarts, and motor-driven watercarts with a big capacity of water for washing the streets.



New German Adler 40 to 50 Horsepower Fire Engine Purchased by the City of Frankfurt-on-Main

Simple street sweepers have been supplied by Louis Renault and Sautter-Harle & Co. The former uses the standard 80-mm. by 120-mm. twin-cylinder motor similar to that employed on its taxicab. The latter is driven by a 90-mm. by 140-mm. twin-cylinder motor. It is very strongly constructed, but otherwise there is nothing distinctive. The brush is at the rear, as in the horse-drawn sweeper, and is driven by an enclosed chain operated from a counter-shaft engaging with a pinion within the differential housing. When raised, the brush is automatically declutched, and there is a special apparatus for regulating the height according to the wear of the bristles. Rubber-shod wheels have been fitted, the rear ones measuring 140 mm. by 90 mm. and the front ones 805 mm. by 75 mm. The wheelbase is 6 ft. 9 in., and the sweeper can turn round in practically any street without reversing.

Particulars of the Laffly Sweeper

The Laffly sweeper is similar to the Renault, with the addition of a 70-gal. water tank. The sprinkler consists of a tube with seven jets placed ahead of the brush and through which a spray of water is forced by a gear-driven pump. This enables the streets to be swept at any time without raising dust and also in frosty weather.

Thirty De Dion Bouton combined sweepers and watering carts are in the service in the city of Paris.

The chassis of these has pressed-steel side members, and the 4-cylinder, 18-h.p. engine, 90 mm. x 120 mm., is placed under the bonnet in front of a dash board. All the parts of the engine are automatically lubricated, and there is an undercover, giving protection against dust.

For the operation of the road brush there is a vertical shaft from the differential, the shaft's upper part having a worm engaging with a skew-pinion, forming part of a dog-clutch and mounted loose on a horizontal shaft, of which the squared end carries a driving piece which can slide along its axle so as to engage the dog-clutch of the worm. During the vehicle's movement the skew-pinion also turns; if the dog-clutch is operated the shaft carrying the pinion is driven by its squared part, and it drives a gear mounted on the left side member of the main frame by means of a coupling shaft set diagonally. The upper gear carries a bevel-pinion gear and works a lower gear mounted on the square shaft carrying the brush and enclosing a second bevel gear. The case of the lower gear supports the axle of the brush. Connection between the upper and lower gears has to allow for alteration in length so as to permit the lifting of the brush. This is obtained by a keyed shaft jointed to the lower gear and able to slide in a tube having grooves to take the keys on the shaft. The tube is jointed to the upper shaft. The whole is enclosed in a dust-proof cover. The brush is balanced and is raised by the movement of a lever at the driver's left hand.

The water tank holds over 550 gal., which feeds an atomizer, to keep the dust down when sweeping, as well as the main water spreaders. The atomizer is in front of the brush and controlled by a hand-wheel at the driver's left hand.

Water-spreader and Pump on De Dion Sweepers

The main water-spreaders are of the Plainchamp type and can be fixed either in front or behind the vehicle. They discharge 44 gal. of water per minute across a width of 45 ft. A centrifugal pump driven by the engine forces the water at a suitable pressure to the spreaders; the driving gear of the pump is in a box forming the cover of the vehicle's change-speed gearbox. The pump is thrown in and out of gear by a lever at the driver's side. The output of each spreader can be controlled independently by the driver.

The weight of the vehicle fully loaded is a little under 6 tons. Empty it weighs about 3½ tons. The track is 67 in. The wheelbase is 9 ft. 7 in., giving a steering lock of about 33 ft.

Testing the Daimler Pumping Engine, with Seven Jet Delivery, for Stettin, Germany

Running cost is easily worked out, according to figures prevailing in any locality, from the following consumption details: Petrol, 6.6 miles per gallon; oil, 200 miles per gallon; grease, 40 miles per pound.

The above figures are for working at about 6 miles per hour on the second speed. Empty, the vehicle can run at about 9 miles per hour, and at this speed light sweeping can be done.

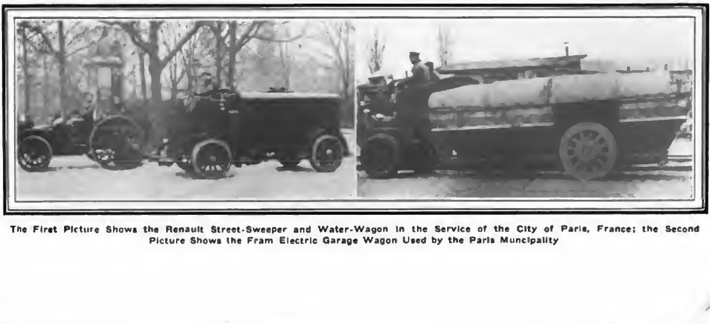
Motor-Driven Water Carts Used in Paris

Another front-drive sweeper and waterer is furnished by the Latil Co., to sweep, water and wash the streets. The power plant is at the front and there are two water pumps. The De Dion Bouton, Renault and Laffly companies have also supplied motor-driven water carts only. The Renault has a 5-ton chassis with motor under the seat and large capacity tank in the place of a body. A centrifugal pump draws the water through a couple of sprinklers placed ahead of the steering wheels. The width can be regulated at will and the flow shut off instantaneously. The De Dion Bouton is practically the same. On the Laffly the motor is under a bonnet and the sprinklers instead of being ahead are on each side.

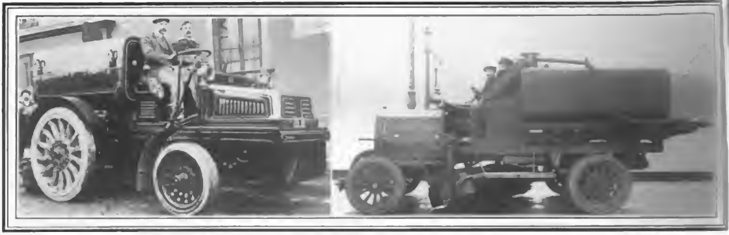
Attempts are being made to collect household refuse with motor vehicles, and two types are being used. One is the Fram front-drive electric and the other a petrol type with the motor under the driver's feet, driving on the front wheels. The power plant is very compact in each case and the body is made as low as possible, being underslung and having such a low clearance that it would probably be impossible to operate the vehicles on any other than city streets. This construction, however, is valuable when emptying the bins, the latter easily being tipped into the vehicle. With the greatest rapidity not more than 3 miles an hour can be made, so the problem has its difficulties. In order to hasten the collection of garbage journeys are made by night instead of by day, and the motor vehicles are fitted with solid rubber tires with steel bands on the rear wheels, and are much quieter than horse vehicles.

Motors Reduce Cleaning Expense 30 Per Cent.

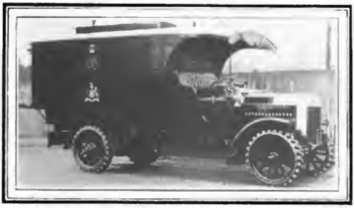
Before the adoption of motor vehicles in Paris for this work it was found that street-cleaning expenses would by their use be reduced by about 30 per cent, and the problem now is to regulate the work so that it may interfere as little as possible with ordinary traffic. It has been found that rubber bandages are more economical than steel-shod wheels. Eight miles an hour is the maximum speed at which they can be worked economically. There is a greater tendency to create dust in their operation than with horse vehicles, but



The First Picture Shows the Renault Street-Sweeper and Water-Wagon in the Service of the City of Paris, France; the Second Picture Shows the Fram Electric Garage Wagon Used by the Paris Muncipality



The Latil Front Drive Combination Street-Sweeper and Water-Wagon in Use in the City of Paris; and the De Dion Bouton Combined Water-Cart and Sweeper Used by the Paris Municipal Authorities



The Dennis Prison Van, with 35-Horsepower Motor, Now Being Used in Great Britain

this defect is remedied by the use of the combined sweeping and sprinkling apparatus as mentioned above.

With regard to making the refuse collecting more efficient, some cities have already found it necessary to employ men with small hand-trucks to carry the refuse bins to appointed stations at the corners of streets, where they are picked up by the electrical vehicle. Some such change will have to be made in Paris.

Municipal Motors in London

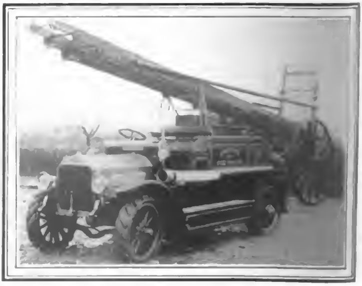
There is a growing fleet of municipal motors in London. After using steam trucks since 1901, the Westminster City Council turned its attention to petrol vehicles in 1908, and after having had one from the Leyland, Lancs., works on trial for some time, it was purchased in 1909. Later on more were ordered, and the fleet is still being augmented. All new Leylands are mounted on specially short 40-h.p. chassis, their wheelbase being 12 ft. 2 in. During most of the mornings from October to April they are employed collecting refuse, and in the very early hours of the morning they assist in washing the streets. From April to the end of September, as they are fitted with interchangeable bodies, they do ordinary street watering during the day time. All the machines supplied by the Leyland Co., of Leyland, England, have a form of live-axle drive, which has proved very successful even in 6-ton vehicles. As far as municipal work goes, the pipe at the side of the rear flushes the gutters as the vehicle proceeds along, while the box spreader will sprinkle 30 ft. of road. The remarkable accuracy with which both systems of watering can be controlled by the levers next the driver can only be realized by following the machine on its round. As macadam roads are rather scarce in Westminster, this will account for the small spreading power of the box sprinkler. A wider area can be covered by fitting a system of rotary wheels geared to the engine, which will throw out the water on either side over a 40-ft. road. Again, by means of a pressure pump, which can be used for two purposes, either for filling the tank from a river or putting pressure on the delivery, a 50-ft. road can be sprinkled.

Triple Combination Engine at Alliance, Ohio

THE triple combination engine in the city of Alliance, O., was built by the Robinson Co. on a chassis furnished by the E. R. Thomas Motor Car Co. of Buffalo, N. Y., the engine, being a four-cylinder, 70 horsepower one, and capable of developing a speed of 65 miles per hour. The pump is of the rotary type, Silsby, and capable of throwing 650 gallons per minute, and maintaining a pressure of from 125 to 150 pounds.

This machine weighs about 7700 pounds complete, carries 750 feet of 2½-inch hose, one 40-gallon tank of chemical, two 3-gallon hand extinguishers, one Pyrene, 250 feet of chemical hose in a basket, one 25-foot ladder and one extension roof ladder, axes, plaster forks, crow bar, door opener, and one section of 4-inch stiff suction hose. The pump has two outlets equipped with relief valves for use in relieving back pressure when nozzles are closed.

Since being in service the machine has traveled about 160 miles and has pumped several hours continuously at differerent times, never making a stop, pumping 2 hours and 10 minutes at a hospital fire where the pressure was low, and



Fire Engine Made by Dennis Bros., Ltd., of England, Supplied to the Bradford Corporation

From Front Wheel Driven Dust-Cart Recently Placed in the Service of the Paris Municipality

without which the building could never have been saved. The engine was overhauled in August last, after three years' usage, and outside of some loose bearings the engine was in excellent shape.

To September 1, 1912, the fire-fighter cost for tires, repairs, gasoline, oil, etc., $812.49 for three years' service, or a little over $200 a year. A steamer would have required three horses to draw it, and as a team of horses costs about $38.50 every month for three years, they would have cost $2,079. A combination chemical and hose wagon requiring two horses to draw it would have cost in three years, $462, making a total cost for horse-drawn apparatus, of which the triple combination engine takes the place, of $2,431, or a direct saving of $1,618.51.

Motor Fire Apparatus Building

An additional point in favor of motor fire apparatus is the location and size of the building required to house it, as compared with the size and location of the building for horses. A building built and equipped for horse-drawn apparatus is almost twice as large as a motor fire apparatus house, requiring a stable, hay and straw mow, making the sleeping quarters of the men upstairs, necessitating the use of sliding poles, where numerous accidents have occurred, often resulting in death from the men getting up from a sound sleep to answer an alarm, or accidentally falling through the pole hole to the floor.

In a motor house everything can be arranged on one floor, the lobby, sleeping room, captain's office, bathroom, locker room and workroom arranged around the apparatus room, giving quick access to the latter at all times, which is so necessary.

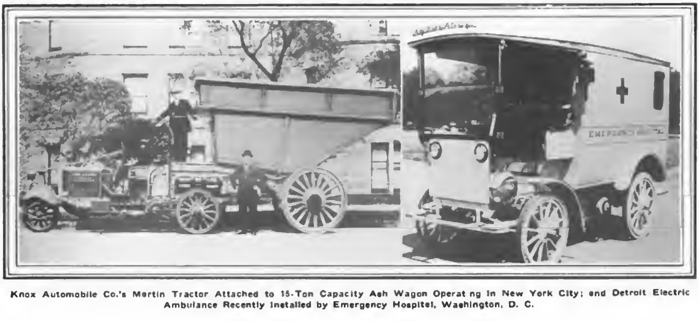
Electric Ambulance at Washington, D. C.

THE accompanying illustration depicts a Detroit electric used as an ambulance by the Central Dispensary and Emergency Hospital, Washington, D. C. The use of this has resulted in a saving of expense. The cost of operation and maintenance of the ambulance has been on an average of $15 a month for electric current, and as yet no expense has been incurred for repairs, etc. The ambulance averages about 250 calls a month. The electric truck is admirably suited for work of this nature, as the smoothness of its running is particularly sedative to a weary patient.

Martin Tractor in New York City

A 15-TON capacity ash-wagon drawn by a Martin tractor, one of the products of the Knox Automobile Co., recently attracted attention in the streets of New York. The wagon is 12 feet in height and 26 feet in length, and was a pretty good weight for the tractor to pull. It was built for the Borough Development Co. of Brooklyn to take 15 tons of ashes at one load at a speed of 8 miles per hour. A great many Martin tractors are at work in different parts of the country drawing from 6 to 12 tons of coal, lumber or other merchandise, and also in fire departments drawing big ladder trucks, water towers or steamers. The 15-ton ash-wagon, however, is the largest load ever attempted by the tractor.

One of the New Leyland Water Carts Supplied to the Westminster City Council, London



Knox Automobile Co.'s Martin Tractor Attached to 15-Ton Capacity Ash Wagon Operating in New York City; and Detroit Electric Ambulance Recently Installed by Emergency Hospital, Washington, D. C.

Selling Commercial Vehicles on Credit

The Small Merchant Is Recognizing the Value of the Motor Truck as a Means of Delivery, but He Is Unable to Buy It on Account of Lack of Means; Should He Be Allowed Credit?—Part II.

IN the October issue of The Commercial Vehicle were printed a number of replies received from leading motor truck manufacturers and dealers in answer to the questions: How are you handling the situation of the small merchant who has not ready cash and yet wishes to purchase? Do you believe many sales would be made if a standard time payment arrangement were adopted? Fifty-six replies were received, of which twenty stated that credit was already given, while twenty-one said that sales on a cash basis were alone admitted. The remainder of the replies relative to this important question are printed below.

CHICAGO, ILL.—Your suggestion concerning title security in the way of a chattel mortgage is a good one and we heartily agree that when cars are sold on the installment plan the users thereof should give further protection through taking out an insurance policy, this policy to be placed in the hands of the selling agents of the manufacturers. However, we do not believe as manufacturers that we would be justified in selling cars on the installment plan unless under a conditional sale contract, the amount involved to be secured by chattel mortgage and further protected by the above mentioned insurance policy.—Chicago Pneumatic Tool Co.—W. W. Bishop.

CINCINNATI, O.—We realize the fact that there are many, many concerns which could use motor wagons advantageously in their business, but which cannot afford to take the amount of the initial cost out of their business in one lump. However, we cannot see our way clear to sell on any other terms but spot cash at the present time, as we feel that the moment has not yet arrived when conditions are such that it can be done without undue risk, which in the end would mean that the price would have to be inflated and the prompt payer would be unduly penalized. One must consider that a motor wagon is an entirely different proposition from the horse-drawn business wagon. The expensive part is the mechanism which can be totally destroyed by carelessness of the driver or by a collision so that only scrap of little value is left. We therefore believe that the majority of manufacturers who turn out a high-grade motor wagon at a reasonable price will continue to demand cash on delivery.—The O. Armleder Co.—A. Reis Meyer.

The Installment Plan Will Be Used

ELKHART, IND.—We believe the installment payment plan is one that must sooner or later be used to a great extent in the sale of business wagons, but the particular plan of handling this class of trade is one that should be very carefully considered. There is no question but what there is an enormous field for the sale of a motor delivery wagon costing from $1,000 to $1,500, but the writer is inclined to believe that a cash payment of $200 on a $1,500 deal is hardly reasonable when the many peculiar features of the automobile business are taken into consideration. The chattel mortgage feature is all right, but the matter of deterioration in value must be carefully considered by the seller as well as the inexperienced driver problem and above all the efficiency and reliability of the car itself will have much to do with a successful operation on a payment plan. We used to sell binders, mowers and other farm implements on time, but we always found that the article worked better and was more satisfactory to the purchaser after he had paid for it than before and this same condition is going to come up to a far greater extent in the selling of commercial vehicles on a payment plan, and consequently the seller must have a sufficient amount of cash money paid down at the beginning to justify him in taking the chance. Looking at this matter in a cold-blooded way without allowing ourselves to be too enthusiastic over the possibilities, we are inclined to think that the first payment should not be less than one-third of the list or selling price and in addition to this the seller must be in a position to do a certain amount of maintenance work until the car is entirely paid for or he will find the payments coming in slow and complaints coming in fast and everybody will be out of sorts and the deal not satisfactory. In conclusion we want to say we are very much of the opinion that commercial vehicles will eventually be sold about the same as any other reliable article, which of course will mean that certain terms will be justifiable, but we do not think the construction end of the business has got to the point where such terms can be utilized to any great degree in the handling of the business as a whole.—Crowmotor Car Co.—C. C. Darnall.

Good Arguments on Both Sides

GROVE CITY, PA.—The question you bring up, the installment payment plan, is one that concerns every dealer or every factory that is turning out commercial cars and there are some good arguments on both sides of the question you bring up. It would seem to me, however, that if a man had a prosperous business he should be entitled to a limited amount of credit. I would, however, suggest a larger cash payment than you have mentioned, owing to the fact that the depreciation of a car that has once been in use is so great. In place of making monthly payments I would give the same terms he would get from the man he buys his supplies from. It is, no doubt, a hardship for a man with a small story to take $1,500 or $2,000 out of his business at one time and I believe every man that is progressive and whose business has not been standing still is entitled to a certain amount of credit. That, however, would have to be taken up thoroughly by the man selling the car.—Bessemer Motor Truck Co.—I. M. Lewis.

Insist on Cash Payment at First

BOWLING GREEN, O.—With reference to your installment payment plan to small merchants who cannot afford to pay cash on the sum amounting to $1,500 or thereabouts, we wish to state that we have in some instances been compelled to allow a sale closed in this matter and have been very successful and cannot complain as to the results. We do not approve of carrying this plan on in a general way and at all times insist upon not less than $500 in cash as first payment, balance in payments of $100 per month. We must insist upon a chattel mortgage on the truck and also protecting ourselves further by requiring that an insurance policy be carried to cover the truck in every respect. We stand ready at all times to give a good merchant an opportunity to get a truck in his service and firmly believe that through this method we acquire considerable advertising and an enthusiastic user, which has a great deal to do toward furthering the progress of the commercial car industry.—Bowling Green Motor Car Co.—W. P. Abbey.

SPRINGFIELD, MASS.—In the first place we do not make any commercial vehicle that sells complete for less than $3,000, but if we did and had to sell on the installment plan I should certainly seek some other means of livelihood. This is especially the case with the class of vehicles you refer to where they are delivered to people who are hardly willing to pay for competent chauffeurs even if they could be secured. For a man to put out a $1,500 car with a $200 advance payment, thereby putting $1,300 worth of property in the hands of people entirely inexperienced and more or less incompetent—anybody who came along with $200—is something that does not appeal to me. If such sales must be made they should be made by an organization equipped to do this sort of business and entirely independent of any factory organization.—Knox Automobile Co.—W. E. Wright.

DETROIT, MICH.—We, not being strictly in the commercial end of the motor car business, but simply selling on the side a few delivery wagons costing $700, our views may not be worthy of consideration in this connection. We believe that a grocery concern or a small merchant or anybody else desiring to purchase a motor vehicle should pay the manufacturer cash for it. Banks are organized and maintained for the purpose of loaning money to those whose business entitles them to it. Therefore, why should the manufacturer go into the money loaning business, which selling on the installment plan certainly means? The motor car business is now in a very healthy condition, due largely to its being on a cash basis, and it seems very unwise to start anything of this kind which will change this condition. The motor car business takes a great deal of money as it is, and when you come to extend these requirements by putting out cars on the installment plan, then you are very likely to cripple the manufacturers, especially those who have small capital, and which, by the way, are the principal ones who are engaged in the manufacture of the $1,200 and $1,500 class of motor vehicles. Dealers doing business on the installment plan would be undoubtedly just as bad off as the manufacturer, so it seems to us what applies to the manufacturers applies to the dealer.—Ford Motor Co.—J. Couzens.

Installment Plan a Necessary One

MILWAUKEE, WIS.—We have been operating under the installment plan for nearly a year. Thus far we have found that when good business judgment is used in making a sale that the purchaser usually comes across in the proper way with his monthly payment. On the whole, this proposition looks to us like a feasible and a necessary one. In many other lines of business a man is able to help pay for additional equipment out of the service which the additional equipment gives him. When properly protected we feel that this plan of installment payment can be successfully developed by the strong manufacturers.—Beaver Manufacturing Co.—Ralph C. Lewis.

CINCINNATI, O.—Regarding the installment payment plan, would state that it is based on connections locally, we having some 44 wagons running in this district. We have found it necessary to secure cash for pleasure cars at the earliest possible moment. We have always sold cars for cash, except a few delivery wagons to firms with whom we were well acquainted, and found them more or less satisfied. There is a difference between the two businesses; when a man buys a car for business purposes ti is much more serious. His very temperament changes, and while he will not worry one about a scratched body he will make an awful howl if the car has to be laid up. Regarding selling on time, this is a distinct department of its own, we think. It costs more to make collections than one often figures. Losses are greater, and getting possession or controlling a portable article like an automobile is difficult. A piece of machinery or a boat even is limited to certain districts, but an automobile is limited in no wise—not even usage. Selling automobiles on time means a loan department. Selling anything on time means a big bank acconnt and a big margin to work on. Will it not interfere with the regular business? One merchant buys for cash at $2,000 less 10 per cent. The other buys at $2,000 less nothing, and when he hears of his neighbor buying the same car at $1,800 he kicks. This happened frequently in the days of sewing machine competition. The trust ended it. Be it as it may, big firms will do it. Some are now selling pleasure cars that way out West. Perhaps they have to; however, as the game grows older this must happen, but with the pleasure car first. A business car sold on time that does not work well means a court proceeding nine cases out of ten.—Haberer & Co.

Light Vehicles Must Have Payment System

MINNEAPOLIS, MINN.—On the sale of trucks with capacity of 2 tons and more your customers will be among the larger jobbers, manufacturers and retailers and you can as easily sell for cash as to make deferred payments. On the sale of trucks of capacity of 1 ton and less your trade will be with the class of customers that can ill afford to take from their business the required amount in cash to pay for the truck or trucks, and while the demand to-day is large for a popular-priced motor vehicle of this capacity it will grow enormously in the next few years provided such vehicle is sold on the installment plan—a small sum down in cash and balance in monthly payments. In other words, to reach a large volume of sales on the ½-ton, ¾ and 1-ton truck capacities it will be necessary to sell in the same way that threshers and engines for farm use are sold. Furthermore, the same as in the thresher business, each agent in every good sized city should have a large supply of parts carried on consignment. To build up and maintain a successful truck business it is as important (if not more so) to have every part of the vehicle on hand for replacement when required as to carry the trucks on hand for immediate sale. In a nutshell, the larger size trucks can nearly always be sold for spot cash, but the smaller sizes must be disposed of on the installment plan. For the protection of the manufacturers or local selling agents in disposing of their product we have to say that a lease properly worded and containing full record of the sales notes given, etc., can be used to greater advantage in making sales than a mortgage. The word mortgage has a bad effect on the feelings of the purchaser occasionally.—Robinson Loomis Motor Truck Co.

Company Formed for Selling by Installment

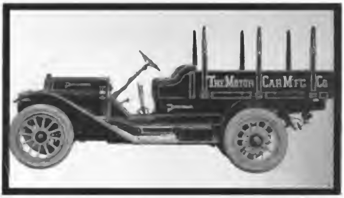
THE Selden Truck Sales Co., of Rochester, N. Y., has been formed for the purpose of selling Selden trucks on the installment plan, and will handle the entire output of the Selden Motor Vehicle Co. The incorporators are as follows: Geo. C. Gordon, William C. Barry, Jr., R. H. Salmons, Henry G. Strong and Chas. H. Stearns, the first three being officers of the Selden Motor Vehicle Co. The plan for selling vehicles has not yet been made public.

The formation of this company is interesting as it gives proof of the tendency which is being shown in the truck industry to give credit to the small buyer.

New Commercial VEHICLE MODELS

Pathfinder Truck

New 1,500-Pound Delivery Shaft-Driven Truck from the Motor Car Manufacturing Co.



Left Side of Pathfinder Truck with Standard Body

A NEWCOMER in the commercial vehicle industry is the Motor Car Manufacturing Co., Indianapolis, Ind., maker of Pathfinder cars, which has recently announced that it is building a 1,500-pound delivery shaft-driven truck on the same chassis used for its pleasure cars.

This new vehicle has right-side steer and control and is equipped with pneumatic tires. The motor is under a hood in front of the dash.

Body Equipment and Wheel Base

The standard body equipment consists of two different types, the covered delivery and the open-box body. The wheel base is 120 inches with standard 56-inch tread.

The motor, clutch and transmission are one unit supported by the four crankcase arms on the main frame.

The four-cylinder, four-cycle motor has a 4⅛-inch bore and a 5¼-inch stroke. It has 40-horsepower with cylinders cast en bloc. The valves, which are all located on one side, are inclosed by removable covers. The crankshaft is of the three-bearing type and made of 45 per cent. carbon steel.

Made from the best grade of nickel steel aluminum alloy and composed of two pieces, the crankcase carries all its bearings in the upper half, and the lower half, containing the oil reservoir, is easily removable for the adjustment of the crank and connecting rod bearings.

View of the Interior of a Panel Body on New Pathfinder

Either the Eisemann or Bosch high-tension magneto can be used in the ignition system.

A model L Schebler, 1¼-inch carbureter, is specified.

Cooling is by thermo-syphon flow. An 18-inch fan running on ball bearings distributes air over the large water-jackets of the motor.

Two plunger pumps are utilized in the lubricating system. One stream of oil is driven to the gears at the front of the crankcase and another to the main rear bearings. Five oil grooves are turned on the outside of each piston for distributing the lubricant. This oil in turn drains back to the crankcase, causing a constant level at all times. The connecting rods, bearings, pistons, etc., are lubricated by the splash system.

A cone clutch with a leather facing is used.

Gearset and Axle Construction

Selective in type, the gearset gives three speeds forward. The gears are nickel steel and annular bearings are used throughout. The clutch and gearset are housed in an aluminum case, bolted to the flywheel housing.

The floating rear axle construction is inclosed in a pressed steel housing.

Two internal metal-to-metal brakes are mounted on the axle housing. Both the service and emergency brakes are equalized and all connections located on the within the frame.

A heavy double drop frame of pressed steel is used and this is reinforced by four cross members.

The springs are half semi-elliptic front and rear, being respectively 38 and 50 inches long. Special wheels are used, the spokes and felloes being extra heavy. The pneumatic tires are 35 by 4½ inches in size.

According to the manufacturers of this new delivery vehicle, there is a heavy demand for it from department stores, wholesalers and jobbers and other lines of business where speedy delivery is important.

New Marmon Truck

Delivery Vehicle with Shaft Drive, Unit Transmission and Rear Axle and Two Standard Bodies

ANOTHER well-known pleasure car manufacturer to realize the opportunities in the making of commercial vehicles is the Nordyke & Marmon Co., Indianapolis, Ind., which has recently placed on the market a 1,500-pound delivery vehicle with shaft drive with a unit transmission and rear axle and pneumatic tires, dual in the rear.

Two standard bodies, a van delivery and an open box, make up the line of bodies.

The wheelbase is 120 inches, the front tread 56½ inches and the rear 65 inches.

The speed of the car is limited by a governor to 20 miles per hour. Right-hand steer and control are used, the gear shifting lever and emergency brake lever being placed in the floor of the car. Clutch and service brake are pedal operated and there is a foot accelerator. The steering column carries an 18-inch wheel on top of which are mounted the levers for controlling the spark and throttle. The gasoline tank filler is located on the outside of the right seat panel instead of under the seat.

Four-Cylinder Motor and Stromberg Carbureter

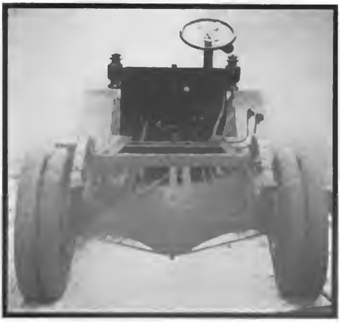
Cast in pairs, the four cylinders of the motor have a bore of 4 inches and a stroke of 5 inches. The crankshaft, which is a solid forging, is drilled on the main bearings and crankpins for oiling.

The carbureter is a 1½-inch, water-jacketed Stromberg.

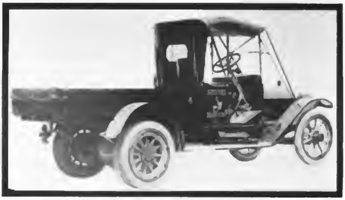
The crankcase, made of aluminum, is of the barrel type and is suspended at three points, the arms not being cast with the case. The two rear supports are formed by a pressed steel truss secured to the end of the crankcase, the outer ends seating in lugs on the frame.

The primary source of ignition is the magneto and the secondary the battery, in the dual system utilized.

A gear oil pump, driven from the camshaft on the right, circulates the lubricant. The main and piston pin bearings receive the oil through the hollow crankshaft. The pins and main bearings are drilled and the pins are grooved.



Rear View of Chassis of Nordyke & Marmon 1,500-lb. Delivery Vehicle



Right-side View of the Nordyke & Marmon Co.'s 1,500-lb. Delivery Vehicle

Fitted to each connecting rod is a small copper tube, through which the lubricant is forced from the crank bearing to the wrist pin bushing.

A centrifugal pump driven from the timing gears impels the flow of water through the cooling system, which consists of a cellular radiator backed by a flat, belt-driven fan.

A cone clutch with adjustable springs under the asbestos facing is the connecting link between the motor and the propeller shaft. There is a universal joint at the forward end of the shaft which moves in a steel torque tube 2½ inches in diameter. This tube is reinforced by diagonal rods from the rear axle tubes to the forward end, under side of the shaft housing.

The aluminum gearbox of the unit transmission is bolted to the rear axle casing and is heavily webbed to insure strength. The bearings are annular ball. The two gear shifting rods are inclosed in a steel tube, the same as in the touring car.

The rear axle of floating type has final drive through flanges, squared at the inner ends. A heavy rib extends the entire length of the main housing, which is made of two sections of pressed steel welded together.

Steel Brake Shoes on Rear Brakes

Steel brake shoes are used in the twin rear expanding brakes. Their diameter is 16 inches with 2-inch face. The fabric used is asbestos. An improved screw and segment permit of ready adjustment from the outside.

An I-beam forging with its weight carried by ball thrust bearings forms the front axle.

Made of pressed steel, the frame is arched over the rear axle and inswept forward. It is reinforced by cross members. The side rails are deep and the flanges broad. At the rear corners of the frame are fitted gusset plates.

The front springs, 36 by 2 inches in size, are perched off center and are semi-elliptic, while those in the rear are elliptic and 38 by 2 inches in size.

Artillery type wooden wheels are used, there being twelve 2-inch spokes at the rear and ten 1¾-inch spokes forward. Annular ball bearings are used in the rear wheels and Timken rollers in those forward.

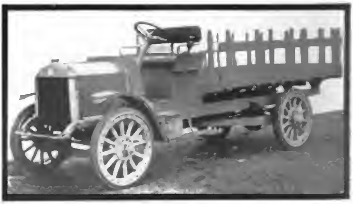
Pneumatic tires, 32 by 4 inches, single in front, and 32 by 4, dual in the rear, are used.

The equipment of the vehicle includes two gas headlights, two oil sidelights, tail light, jack, tire repair outfit and hand pump and horn which is concealed under the hood with the bulb placed on the steering column.

In the illustration at the top of the page, the outside gasoline tank filler is shown in the right seat panel. The lower illustration shows the construction of the rear axle, differential and propeller shaft and the dual tire equipment.

Universal Ton Truck

Worm Drive Adopted, Motor Under the Hood, Left-Hand Steer and Center Control



View of the Universal 1-Ton Truck Fitted with Stake Body

MANY new features are incorporated in the 1-ton truck announced by the Universal Motor Truck Co., Detroit, Mich., the most important being the adoption of the worm drive, the motor under the hood, and the left-hand steer and center control, with a single pedal for the clutch and service brake. The speed of the vehicle is limited by a governor to 15 miles per hour.

Two standard body types are specified, the stake and express bodies with a loading space 10 by 5 feet. Other bodies are optional and include an increase in loading space to 12 by 5 feet.

The wheelbase of the vehicle is 124 inches and the tread 56 inches. The motor of the four-cylinder, four-cycle type has valves inclosed. Its L-head cylinders are cast en bloc. It is rated at 30 horsepower, having a 3¾-inch bore and a 5¼-inch stroke, a long-stroke design.

A fly-ball governor carried at the end of the oil pump housing and fully inclosed operates on a butterfly valve which chokes the fuel supply when the limit of speed, 15 miles per hour, is reached.

Dual System of Ignition

The dual system of ignition is used with an Eisemann magneto and battery. The magneto is at the right side rear of the motor and is driven from the oil pump shaft.

Lubrication is by force feed and constant level splash. The crankcase, barrel type, cast iron, has formed with it an oil tank. The bottom of the case proper has a false bottom or splash basin with individual troughs for the connecting rods. Oil is circulated by the gear pump to a main lead direct to each trough, the overflow passing back to the base.

Cooling is by the thermo-syphon principle. The radiator is an assembly of vertical spiral tubes, which are soldered into brass headers at top and bottom. The top tank is an aluminum casting and the lower one is bronze. On the top and sides of the radiator are vertical radiating fins.

The clutch is a single 14-inch steel disc, clamped between two Raybestos faced plates.

The three-speed, selective sliding gearset is a unit with the motor. The gearbox is made of cast iron and is bolted to the flywheel housing. The gears are 3½ per cent. nickel steel with a ⅞-inch face, the sliding gears operating on four ⅜-inch splines. Main shaft bearings are annular ball on the countershaft and reverse gear idler plain. This unit plant is supported at three points, two at the rear of the crankcase, through integral webb arms and forward by a drop forged, arched hanger.

Drive to the rear axle is through a 1⅝-inch propeller shaft fitted with double universal joints back of the gearbox.

The rear axle worm, hardened and ground steel, 6 inches long and 2½ inches in diameter, is carried on the top section of the rear axle housing as is the differential. The worm shaft is supported at each end on annular ball bearings, while at the rear of the casing are two ball thrust bearings with ½-inch steel balls. The bronze worm wheel is 12 inches in diameter. Spur gear type differential is used, the spurs having ⅞-inch face.

The rear axle is floating with final drive through wheel flanges 6½ inches in diameter, all bearings annular ball. The rear axle housing is cast steel.

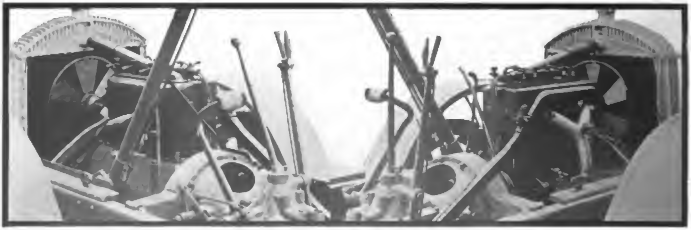
Rails, Axle and Frame

Propulsion is through a triangular pressed steel torque arm. The diagonal rails are 5 inches deep at the rear, where they are riveted to the brake brackets, and 1¾ inch deep forward, where they meet in a triangular gusset. The front axle is I-beam, of the reversed Elliot type. The wheel bearings are Timken roller. The frame is of pressed steel, the rails being straight throughout, the side rails tapering from 6 to 4 inches.

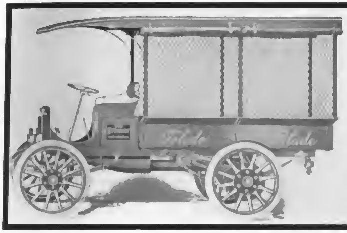
The springs are semi-elliptic front and rear, the forward springs being 38 by 2½ inches and the rear 48 by 2½ inches in size.

Twin internal expanding brakes are fitted, 16 by 2 inches, the steel shoes being faced with Raybestos.

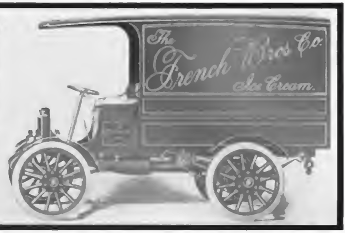
Wooden wheels of the artillery type 34 inches in diameter are used.



Two Views of Motor, Showing Left and Right Side; Also Center Control, Left Steer and Single Pedal



Stewart 1-Ton Truck with Express Body and Fitted with Curtains That Can Be Pulled Down



Stewart 1-Ton Truck with Main Panel Body and Equipped with Doors at Rear of Vehicle

Stewart Ton Truck

Low-Priced Vehicle with Four Body Styles, Stake and Express Body and Two Closed Bodies

THE Stewart Iron Works Co., Covington, Ky., has entered the field of the 1-ton truck with a low-priced vehicle with two body styles.

These two standard bodies are the stake and express bodies, the inside dimensions of the carrying space being the same in both. The width of the loading space is 46 inches and the length 91 inches, measured from the back of the seat. The express body is fitted with curtains which can be pulled down over the wire sides, effectually closing the body. Besides these regular standard body sizes there are two special body styles, consisting of two closed bodies, both having fancy panel sides for lettering and one with plate glass in the front side panels and the other simply a plain panel body. Both of these closed bodies are equipped with rear doors. The inside dimensions of the loading space in the two special bodies is slightly greater than that of either of the other two body styles. The width is 46 inches, the length 92 inches and the height 4 feet 8 inches. These four types of bodies are interchangeable by the removal of four bolts.

A 20-horsepower, single-cylinder motor with two flywheels, the motor under the seat and the planetary gearset are the principal features of the vehicle. This vehicle is priced at $950 with standard body equipment. The transmission of the power is controlled by a lever and one pedal.

Four-Cycle Motor Long-Stroke Type

The motor is of the four-cycle, long-stroke type and is equipped with an extra large crankshaft. It is claimed that the two flywheels give perfect balance and smoothness of running.

Planetary in type, the transmission has two speeds forward. Final drive is through a jackshaft and thence through double side chains to the rear wheels.

The axles are tubular in type, the front being 2¼ inches in diameter and the rear 2½ inches. They are constructed of nickel steel seamless tubing with forged steel ends brazed. The front axle spindle is 1⅞ inch in diameter and it is calculated that this will give an axle-bearing capacity of 7,640 pounds.

The wheels are 36 inches front and rear with 3-inch solid tires. They are mounted on Timken roller bearings.

The Coates Tri-Car

Three-Wheeled Vehicle of 800 Pounds Capacity and a Speed of 25 Miles Per Hour

THE Coates Commercial Car Co., Goshen, N. Y., is building the Coates three-wheeled Tri-Car with two types of bodies, the open and the closed, with a capacity of 800 pounds, the open body having an area of 25½ and the closed style an area of 29½ cubic feet, on an 84-inch wheel base.

Pneumatic or cushion tires may be used.

Maximum speed of the vehicle is 25 miles per hour.

In this three-wheeled vehicle the loading space is over the front wheels and the driver's seat over the single rear wheel.

A 16-horsepower, two-cylinder opposed motor with a 4½-inch bore and 4-inch stroke, is placed forward of the driver's seat, under the body, access being gained to it by a side door in the body.

Ignition is by means of a magneto.

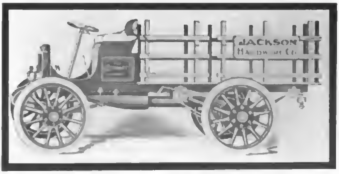
Radiator and Transmission

The radiator is mounted under the forward end of the car.

The transmission is planetary in type, there being two speeds forward and reverse. Final drive is by means of a shaft to the rear wheel.

The steel frame is V shaped and the springs are placed at the front.

The front axle is of I-beam type and is fitted with Timken bearings. A band brake is mounted on the rear wheel.



Stewart 1-Ton Truck Fitted with Stake Body. All Bodies on These Trucks Are Interchangeable

The READERS' FORUM

Gasoline and Electric Cost

EDITOR COMMERCIAL VEHICLE: Will you please give me information on the comparative cost of operation between a gasoline and electric truck of 5-ton capacity? Also which in your opinion is the most economical to purchase and reason for same? E. G. M., Troy, N. Y.

In making a comparison of the cost of an electric and a gasoline vehicle there are several factors that must be taken into consideration. In the first place, a strictly true comparison cannot be made because the fields that these two types of vehicles cover are usually quite distinct. The electric is at its best in short hauls over city pavements and the gasoline vehicle at its best in long hauls. For example, in a large department store electric trucks make all the local deliveries and the gasoline vehicles are used in transferring the goods from the store to the suburban distributing point, where electric vehicles pick them up and make the house-to-house deliveries.

There is not a great deal of difference in the operation of a 5-ton electric and a 5-ton gasoline vehicle, but as such figures will differ considerably in each case, according to the conditions of service, it is impossible to make any statement as to what it will cost a merchant to maintain and operate his vehicles without first making an investigation to ascertain under what special conditions he is going to operate them. If he uses electric vehicles and obtains his power from outside and stores the vehicles at an outside garage, while his neighbor is storing his gasoline vehicles at his former horse stable, has promoted his horse drivers to drive the trucks and buys his gasoline at wholesale prices, the second men will, no doubt, operate his vehicles at a lower cost, provided that they are both covering the same amount of mileage in the same length of time.

It has been computed that the cost per mile for operating an electric vehicle is about 7.5 cents and that all conditions being the same, or comparatively the same, the cost of operating a gasoline truck of the same capacity is similarly the same.

As you have not stated what business the truck is intended for, we cannot advise you which would be the more economical means of transportation. If the work of the truck is to be short hauls over city pavements, by all means get an electric, but if there are frequent runs into the surrounding country and there is a great deal of hill climbing to be done while the hauls are long, the 5-ton gasoline vehicle is the most suitable machine for your business.

Keeping Driving Chains Clean

Editor COMMERCIAL VEHICLE:—I have recently purchased a light electric delivery vehicle with side chain drive, and would like to know how these chains can be taken care of so that they will not become clogged up with dust. I know that washing in gasoline will cut away the dirt, but what is the best kind of grease to put on the chains to keep them running smoothly and free from grit?

In charging the batteries is it better to feed the current a little at a time or to charge the batteries to their full capacity at one time?—J. R. Pitken, Buffalo, N. Y.

In the August issue of THE COMMERCIAL VEHICLE, on page 54, you will find an answer to a query in regard to the care of driving chains. The attention that a driving chain requires is the same on either gasoline or electric vehicles and the same methods of keeping them clean applies in both cases.

One method which is recommended by some of the leading manufacturers is the application of mutton tallow to the chains. After being removed from the vehicle the chain is cleaned with gasoline until all the dirt is removed from between the links and pins. A mixture of about one part flake graphite and five parts pure mutton tallow is heated to the boiling point and the chain placed in this liquid and moved about to allow the mixture to work in around the links and pins. The length of time necessary for this operation varies according to the size of the chain and thickness of the liquid. When the operation has been completed the chain should be hung up until the grease becomes cool, the superfluous tallow being allowed to drip from the chain.

Among the larger users of electric vehicles and some of the smaller ones also, the usual practice is to connect the trucks to the charging plug at intervals during the day whenever possible. In some cases it is necessary to charge the batteries over night but the intermittent application of the current is the better method. While the batteries are being charged a very high temperature is developed in them. This high temperature tends to dry them up and otherwise injure them. The application of the current at intervals during the day gives the batteries an opportunity to cool, and also insures a full battery capacity for the next trip.

While the truck is running a high temperature is developed in the batteries and consequently it is not wise to connect them with the charging plug as soon as the vehicle arrives at the charging point, and it is better to disconnect them a few minutes before the vehicle leaves on its next trip so that they may have an interval in which to cool. This renewal of current can in some cases be accomplished while the truck is being loaded or unloaded, but if it interferes with the running time of the vehicle it is better to do the charging at some other time, always allowing sufficient time for the batteries to cool.

Will Trucks Reduce Cost of Living?

Editor COMMERCIAL VEHICLE:—There seems to be a great deal of emphasis laid on the reduction in the high cost of living that will follow the adoption of motor vehicles in the transportation of food products. I have seen very little mention of this sopposition in your paper and would like to know what you think about it. Will there be any great saving and will it directly affect the cost of food stuffs?—Subscriber, Chicago.

There is absolutely no doubt that the use of motor vehicles will cause a big saving in the cost of transportation of food products as of any other material. The various advantages of truck transportation in this line of business are evident when it is known that one truck will do the work of three or more horse-drawn vehicles and do it much more economically when properly handled. The handling and rehandling of the goods which is necessary in railroad transportation will be done away with, and the amount of land required for the present day market would be considerably lessened, as motor vehicles take up much less room than horse vehicles.

Whether or not this more economical method of transportation will result in the lessening of the high cost of living is a different matter. Let us suppose, for example, that under the present condition it costs a farmer 3 cents each melon on a carload of melons shipped from the farming districts to New York or any other large city, and that this distance is 100 miles or less. The farmer purchases a motor vehicle and saves one-half of this amount. It does not necessarily follow, however, that the retailer to whom the goods are consigned is going to sell the melons at a lower price than he would under the present conditions. The farmer may save that margin of profit for himself. If he is influenced by competition, however, he may let the dealer have the benefit of the increase in profit. Then it remains with the retailer to fix the price of the goods and if he is uninfluenced by competition or other conditions, and does not wish to form a trust or monopoly, he will put that margin of profit into his own pocket.

When the majority of farmers or produce dealers use commercial motor vehicles for the transportation of food stuffs, competition will arise and it is probable a falling off in price will result.

Such a result, however, will only take place when the use of motor trucks has become quite general. A single man operating a motor truck is not liable to lessen his prices. His first step is to extend his market. Then, afterward, perhaps in the face of competition, he may lower his prices.

Locking Device for Standing Electric

Editor COMMERCIAL VEHICLE:—When making calls with the electric ambulance which I drive it is often necessary to leave the vehicle standing on the street for considerable lengths of time without anyone being on hand to watch it and see that it is not tampered with by irresponsible persons. I felt that it was a poor policy to leave such a valuable machine without some kind of a safeguard and consequently I determined to design a lock of some description. The device that I finally hit upon was easily and cheaply made and, although it would be of value only on a vehicle similar to the one I drive, still it may give a hint for the protection of such property and I am sending you an illustrated description of the device.

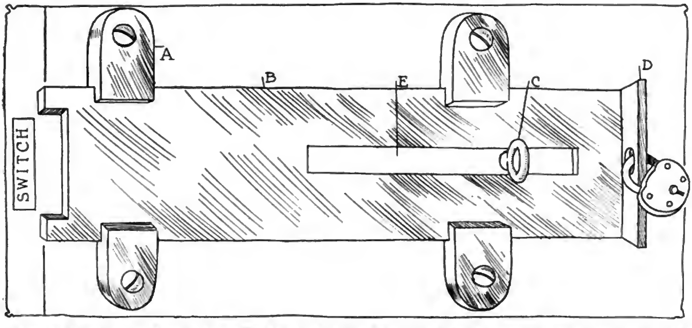
The power switch on my vehicle is placed on the dash and operates on a segment in the floor of the cab and it is this arrangement that makes possible the satisfactory little locking device that I have made. It might be stated here that it is possible perhaps to force the lock, but no person, unless with malicious intent, would attempt such a think and the lock serves to prevent, not prohibit, the operation of the vehicle, as some kind of a tool would be necessary to force the lock.

The lock is composed of six pieces of iron; the cost of the material was nothing, as this was all obtained from the scrap heap. Four door check bases were cut away and filed to a half H edge so that they permitted another piece of flat scrap iron to slide back and forth beneath them as in a slot. The door check irons were placed on either side of this sliding piece and screwed down to the floor. At one end of this sliding piece I cut the iron away, leaving two prongs, one on each side, and at the other end I bent the iron at right angles and cut a round hole of sufficient size to allow one arm of a small padlock to pass through. In the center of the sliding piece and extending about three-quarters of its length, I cut a slot. Then I slid the iron into the groove formed by the four door check irons until the two prongs on its upper end almost touched the dash, one on each side of the power switch, which has to be pulled back a trifle before it can be operated. Leaving the sliding iron in this position, I inserted a set screw with a large eye in the slot at its lower end so that the padlock would lock it to the upright piece on the sliding iron. I screwed the set screw into the floor and the locking arrangement was complete. When the device is not locked the slot in the sliding iron permits it to be pulled back so that the prongs on its upper end do not interfere with the operation of the power switch.—Ambulance Driver, Brooklyn.

Testing Gasoline and Fuel

Editor COMMERCIAL VEHICLE:—My truck makes long runs into the country and often has to stop at out of the way places to obtain gasoline, and, as a result a poor grade of fuel is sometimes obtained. Is there any instrument that my driver can carry with him so that he will be able to test the quality of the gasoline he buys? What is the method of testing the fuel?—H. K. F., Rochester, N. Y.

An instrument known as the hydrometer is obtainable for this purpose. The ordinary type of hydrometer consists of a glass tube similar to that of a thermometer and having a receptacle at the bottom, which contains a weight of some kind. The stem of the instrument is graduated. In testing the gasoline the hydrometer is allowed to sink into the liquid. In the case of the Baumé hydrometer the instrument will sink to 74 or 76 degrees for the best grades of gasoline. The degree to which the instrument will sink is higher when the gasoline is warm than when it is cold. There will be as many as 10 degrees difference at times.



Ingenious Switch Lock for Electric Vehicle. The Switch and the Two Pointe of the Locking Device Are Shown at the Left. A is one of the Door Check Bases Filed to Permit the Sliding Piece B to Move Back and Forth. The Locking of the Screw Eye C, Set in the Slot E, to the Upright D When the Sliding Piece is Pushed Forward as Far as It Will Go, Effectually Locks the Switch in the Neutral Position. This Device is Found to be a Perfectly Adequate Safeguard to the Machine on which It is Used.

Horsepower and Gear Ratio in Trucks

Continuation of E. P. Batzell's Paper—Effect of Throttle Opening on Motor Torque, Thermal Efficiency and Fuel Consumption Curves—Fuel Consumption Variations in Thomas and Franklin Engines

Part IV

ALL the foregoing in connection with the torque, the efficiency and the fuel consumption is based chiefly on logical considerations. Sometimes the results of actual tests may differ from the conclusions arrived at herein. The writer regrets that lack of available test data necessitated the employment of curves at will in some places in these articles. It would be greatly appreciated to receive reliable results of actual tests by means of which one could verify some of the assumptions made. The test of the Franklin engine referred to gives one of the most complete sets of published test results, a number of which check well with the above derived statements and some of which do not. In regard to this latter fact one can say that the tests in general revealed somewhat peculiar conditions of engine action seldom met in practice. For instance, all the tests prove a very low rate of power development by the engines regardless of their valve timing or construction. The volumetric cylinder filling is exceedingly small, being about 50 per cent. at a piston speed of only 800 feet per minute, all of which tends to explain the low power development by choked condition of the engine and imperfect carburetion. During some of the tests at the point of minimum fuel consumption the ratio of air to gasoline in the mixture increased, and during others the mixture was the richest then. The thermal efficiency maximum in any of these tests should correspond closely to the moment of maximum torque, either before or after it, depending on the actual relation between the small volumetric filling and the non-intense air cooling. Therefore, the minimum of fuel consumption also would be found before or after the greatest torque with the possibility, moreover, of even two minimum points on its curve if the tests could be carried out with sufficient accuracy.

One could go into this subject much more deeply by introducing comparisons between the actual thermal balances of motors with the balance predetermined from their actions. In ending at this point the discussion about the nature and effecting reasons of motor characteristics it is timely to indicate a fact shown by the Franklin engine test as well as by the other tests, namely, that the fuel consumption changes but gradually and within more or less close limits throughout a certain range of practically obtainable speed, extending before and after the revolutions per minute of the minimum. This should mean that the motor torque development and thermal efficiency also change gradually within those speed limits.

THE above statement, together with the mentioned tests and curves, deals with motors working under full-throttle opening; that is, receiving the largest possible amount of fuel mixture at all speeds. Should the tests be repeated under similar conditions as before, but with the throttle only partially open, the resulting curves would retain largely the character of those previously found with full-throttle opening. They would differ merely in the location of their starting points, the points of maximum and minimum, and in the rapidity of their drop and rise. The resistance to the gas flow, as interposed by the partially closed throttle, is equivalent in its effects to any kind of choking resistance in the gas passages, such as small valves, sharp bends, narrow ports, etc. The motor torque curve obtained with the partially closed throttle elapses through lower values than that of the open throttle. Both of these curves might touch each other at the slowest speed, then gradually separate in measure as their relative difference in the quickness of the drop increases. See curves T and t in Fig. 8, where T is the open-throttle curve. Similarly, the curves of thermal efficiency will start near the same point, with the efficiency at open throttle reaching relatively higher values at all revolutions per minute, which can be explained by the existing larger volumetric filling in that condition leaving less spent gases in the cylinder to dilute the fresh incoming mixture.

The same reason brings the location of the closed throttle efficiency maximum to lower revolutions per minute than those of the full open throttle maximum, see curves E and e in Fig. 8, retaining their indexing accordingly to the torque curves. The fuel consumption curves resulting from the two foregoing ones would have a shape somewhat as indicated in Fig. 8 by curves F and f. All the curves given here are not from actual tests, and they are intended to serve only as examples of character and shape difference. It is easy to understand from looking at the torque and efficiency curves why the fuel consumption, F, will elapse below, f, the whole length, with, however, a common point of issue at slow speed. This means that at any motor speed it is more economical to work with full-throttle opening, as compared with partially closed throttle. Extending upon other constructive features the above conditions expected from action at different throttle it would result again that the most economical motor will be found in the construction affording the largest and best valve openings, with free and possibly straight passages, which statement appears to be confirmed in practice.

THE fact that at any speed it is relatively more economical to operate a motor with fully opened throttle and the corresponding shape of fuel consumption curve should serve in combination as the basic items assisting in the selection of proper economical motor sizes for use in a given commercial vehicle and for a specified service. This selection can be carried out as described below. Returning to the full consumption curves represented in Fig. 2 and Fig. 3 it can be noticed that the fuel consumption varies about 1½ per cent. through a speed change of 100 revolutions per minute below and above the most economical revolution per minute in either motor. Besides that the Thomas motor shows a variation of about and not over 5 per cent. of the minimum figure during a run under full load with the speed changing from 600 revolutions per minute up to 1,150 revolutions per minute. In its turn the Franklin engine possesses a variation of 4 per cent. between 1,000 revolutions per minute and 1,400 revolutions per minute. In the first instance the minimum is reached at nearly 800 revolutions per minute and in the second at 1,200 revolutions per minute. The economical limit of permissible fuel consumption variation can be established according to the special requirements and features of every service case, taking for the basis of figuring the comparison between cost of fuel saved and the cost of complicating the speed-changing mechanism of the car, if this is made necessary through the requirement to keep the motor within the assumed economical speed limits regardless of the prospective conditions which could be met on a service run. For instance, should the former Thomas motor remain within the 1½ per cent. fuel consumption variation of its minimum rate its speed must be maintained between 700 and 950 revolutions per minute at full throttle. Should it tend to slow down below 700 revolutions per minute due to a change in the work, a lower gear is to be introduced, and if, on the contrary, the limit of 950 revolutions per minute is being exceeded one must shift into a higher gear. The load determines the speed of a motor and therefore between the stated limits the Thomas motor must preserve a power output of not less than 27 horsepower and not over 36 horsepower with the throttle wide open and under any working conditions. See power curve in Fig. 2. In the same manner the power curve of Fig. 3 shows that for retaining the 1½ per cent. of fuel variation in the instance of the Franklin engine its power output must stay between 16 and 18 horsepower. The developed motor torque changes but a few pounds in the above speed and load limits. When figured at a circumference of 1 foot radius in the Thomas motor it stays between 200 and 204 pounds, and in the Franklin between 73 and 78 pounds, which is of great importance in the speed-changing mechanism, the type to be used and the number of required ratios.

RETURNING to the Thomas example and its permissible 1½ per cent. variation in fuel consumption, the progression factor becomes $f = 1.02$, which in the Franklin similarly is $f = 1.07$. If, for instance, the high speed ratio is $R_1 = 3$ in either case the lowest speed ratio $Rn = 15$, the number of speed changes required in connection with the Thomas motor is 71, and 24 with the Franklin. Should it become desirable to incorporate the above little variation of 1½ per cent. under terms of an actual service case, then both engines would have to be connected to the driving-wheels through an automatic gradually speed-changing mechanism, which could obviate the individuality of the driver in changing speeds. That is absolutely essential with the above number and necessary frequency of speed ratio changes. The fact that it is impossible to expect an average driver to continuously operate the speed-changing mechanism in accordance with every minor variation in tractive resistance indicated by this example would show the impracticability of the 1½ per cent. limit formerly assumed, when the matter refers to manually operated speed changes. On the other hand, comparison of the two above examples indicates that the theoretical number of required speed changes rapidly decreases with the increase of the factor f with a greater ratio of the limiting motor torque values.

Should the permissible variation in the rate of fuel consumption amount to 5 per cent. the Thomas motor torque could vary from 204 pounds to 186 pounds, with the factor $f = 1.1$ and 18 necessary speed ratios, which is still much above the practical number. Under similar conditions the Franklin engine would have a torque variation from 68 pounds to 82 pounds, with $f = 1.2$ and 8 or 9 ratios, which number appears more or less practical, although it is twice as great as number of speed ratios employed in an ordinary gear transmission.

The results obtained here disclose some points in regard to the desirable shape of motor characteristic curves, especially torque curves. Should other conditions involving motor economy be equal it is preferable to have the moment of least fuel consumption located on the rapidly dropping part of the torque curve. This latter must not have a rising direction at low speed, which would be particularly undesirable in case the torque maximum is close to the revolution per minute of minimum fuel consumption. In other words, one would lose part of the advantage of less speed ratios by extending the allowable limit of economical revolution per minute because this extension toward the low speed, when passing the moment of maximum torque, ceases to assist the increase of the factor f. The aim to increase this factor is the only reason for extending the economical speed limits on account of the consequent simplification in the speed-changing mechanism, as explained. The reduced cost of the simpler construction is to offset the somewhat larger expense for fuel.

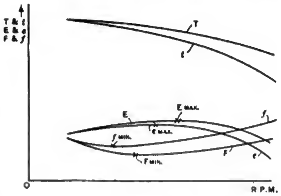


Fig. 8

AFTER certain revolutions per minute are exceeded the rate of torque drop increases rapidly. It would seem desirable to reach the minimum of fuel consumption at higher motor speed, so as to bring it into the zone of rapidly falling torque. The relation between fuel economy and motor torque and efficiency is such that the minimum of the first can be brought into the rapidly dropping part of the second only through proper co-influence of the last. To make the fuel economy not only relatively, but actually best during the decreasing torque it is essential that the thermal efficiency increase very suddenly at this moment, so that its rate of increase will offset the influence of the diminishing torque development upon the fuel consumption. A similar sudden rise of the thermal efficiency is hardly to be anticipated in a correctly designed and built engine, because the items affecting it elapse more or less gradually without any great changes in the rate of their influence. Of course one could make use of certain means to further artificially the quickness of thermal efficiency rise during the desired time, but this could be done only at a sacrifice of the efficiency at other speeds, and moreover with a chance of lowering its absolute value generally, throughout the whole range of motor speed. It would obviously make the conditions of fuel economy worse instead of better. Therefore, it is preferable to maintain such a motor construction as will permit the maximum thermal efficiency and also the best fuel economy during medium high revolutions per minute, and also prevent the attainment of their highest values obtainable in practice.

The curves and figures mentioned in the above will be found in previous issues of THE COMMERCIAL VEHICLE, in which the three preceeding installments of this series of articles appeared.

(To be continued)

TRADE AND PERSONAL MISCELLANY

An official denial of the report that they are going to build a factory at St. Louis is being sent broadcast by the Swinehart Tire & Rubber Co., of Akron, O.

The Buda Co., Chicago Ill., has issued a booklet on motors.

The Earle Gear & Machine Co., Philadelphia, Pa., is sending out a booklet describing its "Herringbone."

Charles B. Shanks has accepted the position as sales manager of the Kelly Motor Truck Co., Springfield, O.

The Atlantic Vehicle Co., New York City, are sending out a booklet entitled "Long Distance Electric Truck."

Italy recently purchased 100 motor trucks for the War Department. These were to be delivered by October 15.

The Whitney Mfg. Co., Hartford, Conn., recently sent out a folder enclosing several booklets describing Whitney chains.

Baker Motor Vehicle Co., Cleveland, O., recently sent out a catalogue describing and illustrating the Baker electric trucks.

A. L. Talbott has been appointed manager of the Atlanta branch of the Swinehart Tire & Rubber Co., succeeding C. E. Holmes, resigned.

L. L. Rittig will be in charge of a factory branch of the Federal Rubber & Mfg. Co., which will shortly be opened in San Francisco, Cal.

National Motor Truck Co., Bay City, Mich., recently sent out a folder entitled "Seven Reasons" why the National Agency is a desirable one.

Motor vehicles have been installed in the Sloss-Sheffield Steel & Iron Co.'s mines near Birmingham, Ala. They take the place of animal traction.

Ware Motor Co., Minneapolis, Minn., have under way the construction of a much larger factory than it has maintained and shipments will begin January 1.

E. E. Denniston has been appointed manager for the district covering the states of Illinois, Iowa and Missouri of the Stewart Motor Corporation, Buffalo, N. Y.

Grand Rapids Motor Truck Co., Grand Rapids, Mich., has issued a catalogue giving illustrations and specifications of various styles of "Hoosier Limited" motor trucks.

F. L. Loomis, of the Robinson-Loomis Motor Truck Co., Minneapolis, Minn., has left the truck manufacturing business and is looking for a line of trucks and pleasure cars.

Mail in Omaha, Neb., will shortly be collected by two motor vehicles if the proper machines can be secured at a price satisfactory to the Post Office Department officials.

J. W. Cully has been appointed manager of the Atlanta branch of the Swinehart Tire & Rubber Co., succeeding S. G. Andrews. He was formerly salesman at the New York branch.

Joseph C. O'Rourke, connected with the Pierce-Arrow Sales Co., Buffalo, N. Y., for the past 6 years, has resigned and accepted the management of R. G. Danahy & Co., local Lozier agents.

The Post Office Department of Minneapolis has a Studebaker car for collecting mail. Service is to be given free for 60 days, and if same proves sati purchase will be made of same

Trucks are being used by fa most exclusively in Orleans Y., for the delivery to cities butter, cream and produce, ow improvement in good roads tion.

W. H. Granger, Syracuse, purchased the business and stock Buick-Keating Company in S Street and will continue to han cars. Fred J. Betts will manag business.

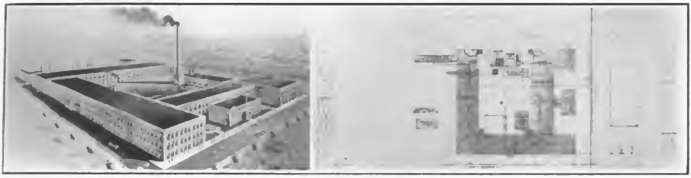
The Kisselkar truck has agai first prize at the California State and acquired the gold medal that bolizes the honor. Other well- trucks competing were the Fe Mack, Gramm, Packard and Stear

A. T. Carnahan has been appoi trict manager in charge of Ohi Virginia, Kentucky, western New western Pennsylvania and eastern igan of the Swinehart Tire & Co. For some time past he has connected with this concern as tire man.

The accompanying illustration an Avery 2-ton truck with a double body in the service of Mr. L. T. ney, of W. Lafayette, Ind., carry load of sheep. The truck has been for three months, and it is expected it will pay for itself in less than It has cost on an average $34 per comparing with a cost with horses per month.

J. G. Budd has accepted the posi general sales manager of the Motor Truck Co., Syracuse, N. Y.

The First Picture Shows an Avery 2-Ton Truck in the Service of Mr. C. T. Downey, of W. La Fayette, Ind., Carrying a Load Sheep; the Second Picture Shows a 5-Ton Pierce-Arrow in the Service of the Park Department of Buffalo



General View and Ground Floor Plan of the New KisselKar Plant, Milwaukee, Wis., Whereby 200,000 Feet Are Added to the Former Facilities. The Original Plant at Hartford, Wis., Will be Continued as Heretofore

was formerly manager of the Victor Motor Truck Co., Buffalo, N. Y., and is a great believer in the 1-ton truck, and the Sanford Motor Truck Co. will specialize on the 1-ton size, turning it out complete at $1,750.

Thomas O'Brien, Syracuse, N. Y., representing The Garford Automobile Co., of Elyria, Ohio, has contracted with J. W. Lee, of the Overland Syracuse Co., to distribute 1913 pleasure cars and trucks of the Garford make. T. F. Fitzpatrick, of the Overland Syracuse Co., will be manager of the truck department.

The Mathiesen Spring Cushion Wheel Co., San Antonio, Tex., which was recently organized with a capital stock of $60,000, will install a plant here for the manufacture of spring cushion automobile wheels. The officers of the company are C. W. Duhler, president; H. Mathiesen, vice-president, and H. A. Marucheau, secretary and treasurer.

The Park Department of Buffalo, is using a 5-ton worm drive Pierce-Arrow truck for the carrying of trees and other shrubbery material in connection with the Forestry Division of the city. Also carried on this truck are sod and road building materials for repairs to the parkways, and it is used for transporting tools from one park to another.

The Federal Chain & Mfg. Co., of Springfield, Mass., has purchased from the Atlas Chain Co., Brooklyn, N. Y., all rights to manufacture and sell "Gaylor" traction grips for commercial vehicles. The "Gaylor" grips were first put on the market in January and from the very beginning have been favorably received by both the commercial car owners and the trade.

The new factory and office of the Hess-Bright Manufacturing Co., at Front Street and Erie Avenue, Philadelphia, Pa., is shown in the accompanying picture. The frontage of the building is 200 feet, and the depth 235 feet. The entire second floor is devoted to offices. The shops will be used at present for repair work and for manufacturing the new Hess-Bright double row bearings. It is intended later to erect a larger plant on the same site.

New Departure Mfg. Co., Bristol, Conn., manufacturers of the well-known American made New Departure ball bearings, has been working 127 hours a week in all departments and 152 hours a week in some departments, with day and night shifts of skilled mechanics, to meet the large demand for these goods. Further increased business has been provided for by factory additions now in process of construction. These additions will give nearly 75,000 square feet of floor space, which will be available late in the fall of the present year.

Commercial Vehicle Incorporations

Otis Motor Sales Co., Utica, N. Y. Motor ehicle business. Capital, $10,000. Incorporators: Edward J. Otis, William T. Cantwell nd T. Harvey Ferris.

Industrial & Trading Co., New York City. eneral commission business in motor vehicles and parts. Capital, $5,000. Incorporators: A. M. Becker, John A. Lemline and H. Ferguson.

Hunt & West, Inc., New York City. Motor ehicle business. Capital, $10,000. Incorporators: Burton R. Law, John W. Cullopy, Jr., nd Elly Z. Parker.

Lamay Mfg. Co., Rochester, N. Y. To anufacture motors, etc. Capital, $25,000. ncorporators: Arthur B. Headley, Philip E. ucker and Arthur C. Lamay.

Motor & Gear Improvement Co., New York ity. Parts, etc. Capital, $1,250,000. Incorporators: Henry C. Derham, S. V. Brady nd Dwight Partridge.

Selden Truck Sales Co., Rochester, N. Y. eal in trucks, etc. Capital, $150,000. Incorporators: Arthur A. Barry, Geo. C. Gordon and Robert H. Salmons.

Walpole Tire & Rubber Co., Walpole, Mass. Capital, $4,500,000. Incorporators: Ernest W. Tinkham, Alvi T. Baldwin and James Dowdle.

Perfection Automobile Body Co., Inc., New York City. Manufacture and sell motor vehicle bodies and appliances. Capital, $15,000. Incorporators: William H. Mendel, William H. Mendel, Jr., and James V. Simpson.

Auto Bankers, Inc., New York City. Motor vehicle business and to sell machines on credit. Capital, $5,000. Incorporators: Clyde E. Black, J. Lester Flerman and Samuel W. Schwartz.

Mears Motor Vehicle Co., Brooklyn, N. Y. Capital, $600. Incorporators: J. W. Mears, E. A. Kellam and C. Mears.

Motor Service Co., Boston, Mass. Capital, $2,500. Incorporators. Harold G. Chisholm, Sanford Small and William H. Evans.

Monarch Auto Truck Co., Brooklyn, N. Y. Capital, $5,000. Incorporators: Daniel R. Rice, Helen Person and Walter H. Babcock.

The Fordham Co., Rochester, N. Y. To manufacture and deal in motor vehicles, etc. Capital, $3,000. Incorporators: Gerald F. Cox, Eugene A. Reinke and Richard Stanton.

R. H. Conty & Co., Inc., New York City. Manufacture and sell motors, parts, etc. Capital, $2,500. Incorporators: R. Henry Conty, M. Conty and Emil Frankel.

Electric Car Sales & Service Co., Inc., Rochester, N. Y. Electrical motor vehicles and equipment. Capital, $10,000. Incorporators: Max Bernstein, Minnie L. Bohrer and Glenn H. Lealy.

Never Skid Mfg. Co., Inc., New York City. To manufacture non-skid devices for motor vehicle tires, etc. Capital, $50,000. Incorporators: Daniel E. Wing, Geo. L. Lewis and Chas. H. Stanton.

Bucksport Motor Co., Bucksport, Me. Capital, $6,000. Incorporators: J. E. Witham, H. Neil Churchill and W. C. Conary.

Automobile Transportation Co., Lowell, Mass. Capital, $25,000. Incorporators: Ralph P. Champney, Geo. E. Hardy and Geo. M. Faulkner.

Pope-Hartford Co. of Boston, Boston, Mass. Motor vehicle business. Capital, $100,000. Incorporators: Geo. L. Dodd, Charles W. Cousens and Fred H. Lucas.

New Factory and Office of the Hess-Bright Manufacturing Co., Philadelphia, Pa.

Robert H. Martin has become manager of the Buick Motor Co.'s branch at Washington, D. C. He has succeeded T. S. Johnston, who has been made Eastern sales manager of the Republic Motor Co.

The Jefferson Garage Co., Syracuse, N. Y., has opened its new garage in the Freeman Block, 428 E. Jefferson Street. Charles J. Roehm, who has handled the National cars for a number of years, will manage the business, and besides the National, the Hupmobile, Alco and International trucks will be sold. The garage includes besides a salesroom a service department, repair and painting shop.

The capital stock of A. Arthur Benjamin, Inc., Syracuse, N. Y., has been increased from $5,000 to $100,000, the present stockholders besides Mr. Benjamin being Ernest F. Fuller and Harold L. Dyer. The present garage is at 410 W. Onondaga Street. An extra garage has been purchased and the concern plans larger activities throughout Central and Northern New York. Packard pleasure cars and trucks are both handled.

The accompanying picture shows several piles of pressed steel frames at the factory of the Baker Motor Vehicle Company. The preliminary work of drilling and cleaning is being done here in the open. About 100 feet of the embankment has been cut away and leveled off for superior accommodation. The two express trucks standing on the flat car are ready to be shipped. The panel-bodied car is one of an order for six cars from a large department store in Washington, D. C.

New Commercial Vehicle Agencies Established Throughout the United States

Place	Car	Agent
Washington, D. C.	Modern	The Peerless Motor Transfer Co.
Missoula, Mont.	Modern	J. Deakin.
Marion, O.	Modern	C. A. Merchant.
Winston-Salem, N. C.	Modern	The Motor Co.
Ft. Wayne, Ind.	Modern	Drege-Harris Motor Truck Co.
Adrian, Mich.	Modern	J. Beckenbaugh.
Nashville, Tenn.	Modern	Wm. Cellilouetts.
Sydney, Australia.	Modern	H. Halburn-Potts
Philadelphia, Pa.	Modern	Wallace Automobile Co.
Lewistown, Pa.	Dayton	Lewiston Motor Co.
St. Louis, Mo.	Dayton	Allen Baker.
Kansas City, Mo.	Peerless	Holcker-Elberg Mfg. Co.
Dallas, Tex.	Peerless	John Deere Plow Co.
Spokane, Wash.	Peerless	W. J. Healey.
Worcester, Mass.	Adams	Power Truck Sales Co.
New Orleans, La.	Adams	Joseph Schwartz Co., Ltd.
St. Paul, Minn.	Smith	Motor Truck Co.
St. Louis, Mo.	Smith	Geo. C. Brinkman Motor Truck Co.
Cincinnati, O.	Smith	Commercial Motor Sales Co.
Steubenville, O.	Packers	Steubenville Motor Car Co.
Pittsburgh, Pa.	Packers	Union Motor Car Co.
Brooklyn, N. Y.	Packers	Wendell & Partridge.
Cleveland, O.	Packers	A. W. Hall Automobile Co.
Sydney, N. S. W.	Packers	W. Herman Slade & Co.
Buenos Aires	Packers	J. Rheinstrom.
Kokomo, Ind.	Franklin	James H. Carnelly.
N. Platte, Neb.	Franklin	J. S. Davis Auto Co.
St. Louis, Mo.	Commerce	Standard Automobile Co.
St. Louis, Mo.	Locomobile	Locomobile Co. of America.
St. Louis, Mo.	Flanders	Colonial Automobile Co.
Cen. Village, Conn.	Federal	U. LeFrance.
New Haven, Conn.	Federal	Alling Garage Co.
Hammond, Ind.	Federal	E. C. Minas & Co.
St. Charles, Ill.	Federal	C. S. McCornack.
Evanston, Ill.	Federal	Geo. C. Foster & Co.
Vancouver, B. C.	Federal	H. J. Tucker.
Pueblo, Col.	Federal	Ideal Motor Car Co.
Washington, D. C.	Federal	Louis Hertig.
Richmond, Va.	Federal	Oakland Auto Co.
Trav'se City, Mich.	Federal	Traverse City Iron Works
Rochester, N. Y.	Federal	J. Cunningham.
Jamestown, N. Y.	Federal	Edwin Wells.
Syracuse, N. Y.	Federal	A. J. Jackson.
Petaluma, Cal.	Federal	Jos. Peoples.
Sacramento, Cal.	Federal	J. D. Lauppe.
Auburn, Cal.	Federal	H. W. Davis.
Monticello, Ky.	Federal	G. O. Bassett.
Toronto, Ont.	Federal	Central Garage & Supply Co
Schenectady, N. Y.	Federal	Sterling Garage.
Augusta, Ga.	Federal	Lombard Iron Wks. & Supply Co.
St. Louis, Mo.	Federal	Federal Truck Co.
Victoria, B. C.	Federal	Vancouver Island Motor Co.
Portsmouth, O.	Federal	David Stahler.
San Antonio, Tex.	Federal	Alamo Automobile Co.
Newark, N. J.	Federal	B. F. Adams & Co.
Hartford, Conn.	Federal	R. D. & C. O. Britton Co.
Denver, Colo.	Federal	W. W. Barnett.
Cincinnati, O.	Federal	Cincinnati Motor Car Co.
New Orleans, La.	Federal	Fairchild Auto Co.
Wilmington, Del.	Federal	Pennsylvania Ave. Garage.
Ft. Wayne, Ind.	Federal	M. N. Plumadore.
Minneapolis, Minn.	Federal	Pence Auto Co
Detroit, Mich.	Federal	Thompson Auto Co.
Pittsburgh, Pa.	Federal	Union Motor Car Co.
Boston, Mass.	Federal	C. E. Whitten.
Stockton, Cal.	Federal	Sampson Iron Wks.
Bakersfield, Cal.	Federal	Ben L. Brundage.
Watsonville, Cal.	Federal	H. G. Brewington Co.
Reno, Nev.	Federal	J. R. Wainwright.
Salt Lake C., Utah.	Federal	Cheeseman Auto Co.
Los Banos, Cal.	Federal	W. M. Roberts.
Fresno, Cal.	Federal	C. W. Hobson Co.
Hamburg, N. Y.	Federal	D. W. Brodbeck.
Connellsville, Pa.	Federal	Connellsville Garage.
Ventura, Cal.	Federal	R. O. Dennison.
Pasadena, Cal.	Federal	Monroe Motor Co.
San Diego, Cal.	Federal	Hunt Auto Co.
Santa Anna, Cal.	Federal	T. W. Neely.
Anaheim, Cal.	Federal	P. J. Weisel & Co.
Long Beach, Cal.	Federal	McKenzie & Bellows.
Whittier, Cal.	Federal	Saunders Bros.
Imperial, Cal.	Federal	Edgar Bros.
Hollywood, Cal.	Federal	J. E. Carroll.
Pomona, Cal.	Federal	Whip & Zander.
Pendleton, Ore.	Federal	M. K. Long.
Tillamook, Ore.	Federal	A. H. Harris.
Eugene, Ore.	Federal	J. S. Airheart.
Albany, Ore.	Federal	Barratt Bros.
Salem, Ore.	Federal	W. J. Pruitt.
Tacoma, Wash.	Federal	Pacific Car Co.
Taunton, Mass.	Federal	Brownell & Burt.
Fall River, Mass.	Federal	Robt. W. Powers.
Fitchburg, Mass.	Federal	Fitchburg Hdwe. Co.
Springfield, Mass.	Federal	Wm. H. Baxter.
Lawrence, Mass.	Federal	Smith Bros.
St. Paul, Minn.	Federal	Pence Auto Co.
Dallas, Tex.	Federal	Alamo Automobile Co
Houston, Tex.	Federal	Alamo Automobile Co
Waco, Tex.	Federal	Percy Willis.
Austin, Tex.	Federal	Ben M. Barker.
Victoria, Tex.	Federal	Texas Motor Car & Supply Co.
Des Moines, Ia.	Chase	Garver Hardware Co.
Buffalo, N. Y.	Universal	Mason B. Hatch, Inc.
Pittsburg, Pa.	Universal	Pittsburgh-Chalmers Co.
Washington, D. C.	Universal	Geo. Esselman Co.
San Diego, Cal.	Universal	Paxton Motor Car Co.
Cleveland, O.	Universal	The Universal Truck Co. of Cleveland.
Province of Ontario	Universal	Arthur Bailey.
Chattanooga, Tenn.	Alco	Auto Repair Co.
Asheville, N. C.	Alco	Asheville Auto Co.
Memphis, Tenn.	Alco	Southwestern Motor Car Distributing Corp.
Grand Rapids, Mich.	Alco	E. A. Merrill.
Kankakee, Ill.	Alco	Kankakee Motor Car Co.
Erie, Pa.	Alco	Star Garage Co.
Minot, N. D.	I. H. C.	International Harvester Co
Montreal, P. Q.	I. H. C.	International Harvester Co.
Nashville, Tenn.	I. H. C.	International Harvester Co.
New Albany, Ind.	I. H. C.	International Harvester Co.
New Orleans, La.	I. H. C.	International Harvester Co.
N. Battleford, Sask.	I. H. C.	International Harvester Co.
Ogdensburg, N. Y.	I. H. C.	International Harvester Co.
Oklahoma City, Ok.	I. H. C.	International Harvester Co.
Omaha, Neb.	I. H. C.	International Harvester Co.
Ottawa, Ont.	I. H. C.	International Harvester Co.
Parkersburg, W. Va.	I. H. C.	International Harvester Co.
Parsons, Kan.	I. H. C.	International Harvester Co.
Peoria, Ill.	I. H. C.	International Harvester Co.
Philadelphia, Pa.	I. H. C.	International Harvester Co.
Pittsburgh, Pa.	I. H. C.	International Harvester Co.
Boston, Mass.	Standard Woven Fabric Co.'s "Multibestos" Brake Lining.	A. L. White, Mgs.
New York City	" "	Flint & Chester
Philadelphia, Pa.	" "	Petry-Cassidy, Inc.
Buffalo, N. Y.	" "	James G. Barclay
Detroit, Mich.	" "	Fred E. Holmes Co.
Chicago, Ill.	" "	F. E. Sparks
San Francisco, Cal.	" "	Fred Ward & Son
St. Louis, Mo.	" "	Capen Belting & Rubber Co.
Troy, N. Y.	" "	Fred K. Blanchard
Boston, Mass.	Motz Tires	Standard Tire & Rubber Co.
Los Angeles, Cal.	Swinehart Tires.	W. B. Guyton Tire & Rubber Co.
Portland, Me.	Goodyear Tires.	Goodyear Tire & Rubber Co.

Open-Air Work at the Baker Motor Vehicle Co.'s Factory

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at 231-241 West 39th Street, New York

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Vol. VII, No. 12 CONTENTS December, 1912

The Elasticity of Motor Truck Service 5
Humanities of the Electric Battery 14
The Electric Truck in Great Britain 16
The Editor's Viewpoint 18
Keeping Track of Cost of Operation 20
A Simple System for Keeping Costs 24
The Guarantee of the Manufacturer 27
General Progress of the Truck Industry 30
Contractor Uses Trucks 32
Dog-Carrying Vehicles 33
Activities in the Motor Truck World 34
Manufacturers' Convention at Detroit 36
Some Papers Read at N. A. A. M. Convention 38
Trade Conditions Throughout the Country 40
Municipal Service Extensions—Vehicles in Baltimore 42
New Commercial Vehicle Models 44
The Readers' Forum 52
Truck Design from Driver's Standpoint 54
Aids and Accessories—Service Suggestions 58
Horse Power and Gear Ratio in Trucks—Part V 60
Trade and Personal Miscellany 64
Commercial Vehicle Incorporations 65
New Commercial Vehicle Agencies 66

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THE

SPEEDOGRAPH

Like the Cash Register Eliminates Temptation and Affords Protection

Every minute that your truck remains idle costs money. The **Speedograph** gives you a complete record of your truck movement and permits you to so systematize your transportation **problem** as to obtain the maximum efficiency.

Superintendent Wurster of the Orange Brewery of Orange, says:

Orange, N. J., Sept. 28, 1912.
Recording Speedometer Co.,
54 Clinton Street,
Newark, N. J.

Gentlemen:—In reply to your letter of the 25th inst., regarding the speedographs which you attached to our four motor trucks, "what satisfaction they are giving," beg to say that the same are working to our entire satisfaction. We are able to keep track of our drivers on their routes, tell how many stops are made and time of each stop, also how fast they run their trucks, and in fact the speedographs give us the same information as if we had one of our officials go along with the drivers on their routes.

We can recommend your speedographs to any one who may be in need of same or any one who may have a motor truck.

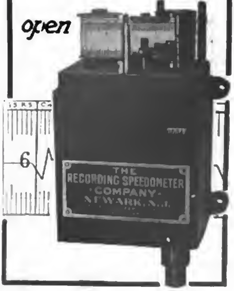
Yours very truly,
ORANGE BREWERY.
W.F.W/M. Wm. F. Wurster, Supt

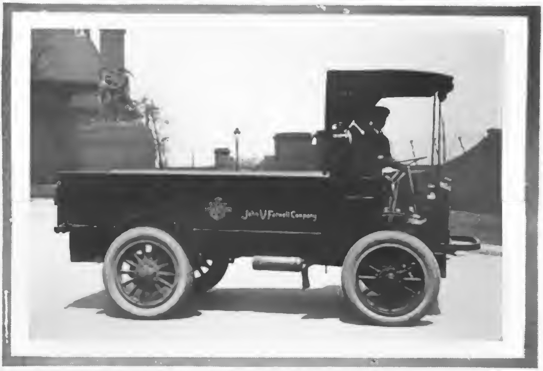
Full information upon request

The Recording Speedometer Co.
54 Clinton Street, Newark, N. J.

General Agents:
AMERICAN TAXIMETER CO.,
735 7th Ave.
NEW YORK.

49 Lansdowne St., Boston.
12th & Vine Sts., Philadelphia.
1225 13th St., N. W., Washington.
12 Hubbard Court, Chicago.
4533 Delmar Blvd., St. Louis.
61 Elizabeth St. W., Detroit.
436 Van Ness Ave., San Francisco.
835 Conti St., New Orleans.
Broadway & East Union St., Seattle.





The Autocar

Get The Right Car For Your Business

Many merchants get a wrong start in their motor delivery service. Having reached the conclusion that motor trucks are a necessity, they select a car unsuited for their work.

These men pay too much or too little for their trucks, getting a car that is either too heavy and cumbersome for their particular merchandise or too light in construction to stand the daily delivery grind.

John V. Farwell Company, of Chicago, got the right start Instead of experimenting with doubtful motor trucks, they bought AUTOCARS at the outset. They knew the satisfaction THE AUTOCAR was giving to hundreds of leading business concerns. They knew its ability to withstand hard daily use in all climates and all seasons.

So John V. Farwell Company placed with us an initial order for six cars. They now use AUTOCARS exclusively and the results to their business are expressed in the following statement recently made by the firm:—

"While we have largely increased our telephone facilities and conducted a more aggressive and thorough sales campaign, we feel that the service rendered by our commercial vehicles is primarily responsible for the large and steady increase in our city sales."

More than 800 other individuals and corporations owning from one to one-hundred AUTOCARS each, bear testimony that our truck is a good investment. We shall gladly send you their names on request.

The right start in a motor delivery system will mean *your* business advancement. It will enable you to take care of the rush of winter trade and carry out every delivery schedule, regardless of slippery pavements and stormy weather. Begin your motor delivery system now with THE AUTOCAR—the car of proven value.

Write for Catalog No. 4 D showing delivery car designs

BRANCHES AND SERVICE STATIONS—Philadelphia, New York, Boston, Providence, Newark, Chicago, St. Louis, San Francisco, Los Angeles, Louisville, Toronto, Buffalo, Scranton, Harrisburg, Baltimore, Washington, Atlanta, Reading, San Juan, Wilmington.

"Used In Every Line of Business"

The Autocar Company, Factory, Ardmore, Pa. *Established 1897*

Motor Delivery Car Specialists

Continuous Efficiency Guaranteed

The COMMERCIAL VEHICLE

Vol. VII December, 1912 No. 12

The Elasticity of Motor Truck Service: Suitable for All Businesses

The Motor Vehicle Can Be Adapted to All Services from That of the Huge Contracting Company to That of the Small Tobacconist

THIS article shows how the motor truck can be successfully used in all branches of business, however big or however small. The varied nature of transportation problems has no effect on the efficiency of the motor truck; such differences do not affect the value of the service obtained but they affect considerably the nature of the service obtained. Consequently it may be assumed, from the start, that every business man with a transportation problem can solve it by means of the motor truck.

BUT he must take advantage of the elasticity of such service and adapt the motor truck to his special business in a specified service. The motor truck is here shown working efficiently for building contractors, brick delivery, drug stores, furniture dealers, commission stores, varnish dealers, supply companies, cigar dealers and tool suppliers, and in each case actual results are given obtained from personal observation. The truck is shown to be a paying proposition, even if misused.

NO human being on earth is faced with greater and more varied problems than the motor truck. The dawn of a renaissance period in the history of transportation has already been heralded and the time is fast approaching when the commercial vehicle, by the sheer force of its efficiency and vitality, will have emerged victorious from what may be called the test transition as the one paying, serviceable, elastic and common-sense means of delivery in every industry.

The casual observer in the streets of any big industrial and manufacturing center will notice the remarkable diversity of businesses in which the motor truck is being employed, even at the present time, when a mere fractional percentage of motor-driven vehicles are being used in lieu of the horse wagon. The florist uses it to convey the most delicate blossoms to the buyer; the builder uses it for transporting huge blocks of stone and granite. For long-distance work and house-to-house delivery trucks have proved efficient; and every day new lines of business are being added to the list of motor truck users.

The really wonderful—and it is wonderful—point is this: Every business, from the great wholesale business handling bulky material to the retail tobacconist or confectioner dealing in small wares, has a definitely defined transportation problem of its own, and each problem can only be solved as an entirely separate and finite subject; for not only are the transportation problems of businesses of an essentially different nature separate, but no two businesses dealing in the same goods and in the same districts have an exactly similar problem. Yet, notwithstanding, the motor truck, faced with a thousand problems and in spite of a great deal of prejudice and opposition, has successfully provided a solution to the delivery problem of every business, and has shown that in comparison with the horse vehicle it can both save money and earn money at one and the same time.

In nearly every case where a motor truck has been adopted in all lines of business, and where the general delivery system has been modified to suit the superior service, it has made good. Ninety-nine per cent. of the failures have been due to the lack of business intelligence on the part of the users, and not in any way the fault of the vehicle. And even if the clause of "modification of delivery conditions" is eliminated, it will be found that the vast majority of commercial vehicles, although working on horse-pace schedule and with horse-wagon methods behind them, have proved their case. For within a short while after the adoption of a motor truck it is found by the owner that

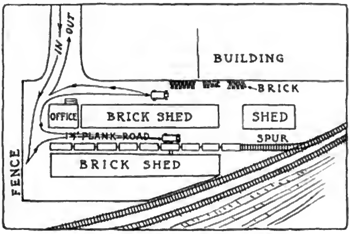


Fig. 1—Loading Conditions at a Brick Shed

its mere presence necessitates improved and accelerated methods. It may be losing money or it may be gaining it, but in any case it will be speedy, and an atmosphere of mechanical alacrity and precision will gradually form, even in spite of a blindfolded owner.

It is only by obtaining a clear comprehension of the extent of the test which the motor truck has undergone, and of the multiplicity of problems which it has faced and still has to face that the sterling quality of its service can be realized. As stated, every man's business has its own particular problem. Department store work demands one schedule, laundry business another; furniture and piano-hauling demand care in handling; grocery work requires service at special hours on long hauls and runs with many stops at other times; drug work requires a superior man for driver; coal-handling demands extra work in slippery and stormy weather; hauling building material calls for heavy loads on both short and long hauls and is generally attended with very poor loading and unloading facilities; many florists and confectioners and others in what may be called the "luxury" trades, consider a truck largely as an advertisement. A truck of any make may be called upon to meet any one or a combination of these conditions, and it must do so when the temperature is 100° in the shade or 40° below zero, on ice-covered asphalt pavements or through deep sand in summer. And all must be done without the slightest suspicion of failure; otherwise the battle has been won by the horse.

Conditions Must Be Fitted to the Truck

The lesson to be learned from the fact that the motor truck has made good in the teeth of adverse conditions and the stupidity or absurd conservatism of users is that **the designer has gone as far as he can to perfect the motor truck to fit all conditions, and that it is now time to fit conditions to the motor truck. Before the machine can really fill its place the internal systems of any business must correspond with the machine and be so modified as to keep the truck at all times working to its full extent.** Differences in internal systems accentuate differences in external systems; in fact, often create them. Some stores handle no bulk goods and hence can adopt conveying-devices and trunk-loading systems to reduce the ideal time of the motor vehicles. Others handling stoves, furniture and care goods are hindered from using either, and load in bulk by hand. Some firms can have extra bodies and load one body while the truck chassis, fitted with another body, is away delivering other loads, though in the case of department stores few have the loading space to accommodate an extra body or handle it with rapidity. Department stores, as a rule, load by hand in a more or less crude fashion, and yet motor trucks are making good with them on account of the greater range and quickness of delivery of the commercial vehicle.

The subject of modifying and reorganizing the internal system of a business is very large and most important and will be dealt with fully in succeeding articles. The present article is intended to show how varied is the service of the motor truck and how in all cases where a definite system has been applied the motor truck is making good.

A certain department store in a big Western city is running two 1½-ton vehicles in its delivery work. The chief hindrance to the success of their operation is found to be lack of shipping-room space. The machines are loaded from a platform at the rear of the store. Bundles drop into the shipping room through a chute, each package being tagged. A boy helper puts the bundles into bins according to the route to be taken. Each of the packages is billed to the driver in duplicate, a copy being kept in the shipping room for reference in case of loss. On return the driver must show receipt for every package and an explanation for every one not delivered.

No Preference Given to Motors Over Horses

Drivers load their own cars from the bins so far as packages go and on an average it takes about 1 hour to load. Any bulk packages are left on the platform or in the shipping room according to the weather. An attempt has been made to facilitate the work of the trucks to a certain extent by allowing a little more platform space to the motor vehicles, but beyond this no preference is given the motors over the horses.

The horses in the service of this department store do about 15 miles per day with a 1-ton load. A branch stable and sub-station is kept up at a distance of 8 miles. Motor delivery is made to this sub-station every afternoon. The vehicles make a distance of from 30 to 40 miles per day, with one stop about every mile. The territory covered is within a 10-mile radius.

With most of the department stores trucks stand idle during a large period of the day, the main requirement of this class of delivery service being the keeping of schedule. The truck is required to be absolutely reliable, but at the same time there are idle periods with time to keep the truck in the best of condition. **To really fit the motor truck to department store delivery and keep it working all the time will require an entire reorganization and change of delivery method in most cases. This change, however, will come gradually.**

The Building Material Delivery Proposition

A vastly different line of delivery work is that of building material. Here the chief problem is loading and unloading; the difficulties are met with at the terminal facilities connected with the work. In loading the machine the old horse-pace methods must be met and an hour or so consumed in getting the load on. These conditions will better as more trucks are adopted, but at present work in this direction has only just begin. Arrived at the other end of the journey one can meet almost any kind of a delay in getting rid of the load. The way into the building may be blocked, or teams may be ahead of the motor truck. For example, in Chicago, where a large amount of building is going on in the business district, it is not unusual to see half a dozen wagons waiting their turn at a building entrance to deliver.

Loading System for Ordinary Building Brick

The Thomas Moulding Co. is using a 5-ton truck in brick and terra cotta hauling and is having good success with a loading system for ordinary building-brick. This common brick is loaded into crates, three of which make a load. When the truck arrives the crates are hoisted to the truck platform by means of a steam crane. The whole loading operation does not take over 5 minutes. Unloading is done by dumping, the operation taking about 7 minutes. With pressed brick and more expensive types this system cannot be used, but all handling is done by hand, the layers of brick being separated by straw and great care taken against breakage. **With this class of material about 35 minutes is taken for loading and 30 minutes for unloading,** according to the driver of the machine. It takes 2,500 bricks to make a load averaging 4 pounds to the brick (common building brick.) **For one month's work the machine averaged 65 miles a day.**

On a recent delivery trip the motor truck left the garage at 3:40 p.m., arriving at the yards 2 miles away at 3:56. A block of bad road led to the yards, which were planned as in Fig. 1. The yard enclosure was rectangular in shape, about 500 feet long and a little less than half of that in width, the one corner being cut off at an angle by the main line of railway running, as shown.

Yard Laid Out for Horse-Pace Practice

In the center of this enclosure, which was mostly fenced in, were the brick sheds in two rows. Between the rows a space was left with a spur track from the railway line on which 8 flat cars were standing. The track was on the right as the truck entered. Between the cars and the sheds was a 14-foot planked roadway. A similar roadway was left on the outer side of the sheds, making three roadways in all. The left-hand row consisted of two sheds divided into bins or compartments; the right-hand one was but a single building similarly divided. The yard was undoubtedly laid out before the days of motor trucks and conformed to horse-pace practice.

If motor trucks were used exclusively in hauling from this yard better provision would have to be provided for exit. As arranged at present it would be necessary for a truck to wait its turn at a roadway, or if it got in it would be likely to be blocked by some other machine further down the road, preventing it from leaving without the second truck backing clear out of the yard to let the first one out. Space between the sheds could be easily cleared and widened at the ends, however, so that a motor truck could turn at either end. This would prevent the backing into position, which was necessary on the trip in question. A very few changes, however, could make this yard conform to motor truck pace, and it would not be a hard job to design some form of power loader which could be moved from place to place along the roadways to hasten the brick loading. This might be a further development of the hand-loading idea described later.

To follow out the specimen trip and note the effect of the yard layout on an actual delivery the single lines in Fig. 1 denote the route which had to be taken by the motor truck in getting into position for taking on the load.

In the first place the entrance was narrow so that it took some maneuvering to get the motor truck around the bend at the end of the first shed.

Four Employees Watching the Operation

When this was done it was necessary to back the truck down the roadway between the sheds for a distance of about 200 feet, causing further delay, during which four men employed in the yards spent their time watching the operation. It took 4 minutes for the machine to get into actual position to load, the machine standing about 2 feet from a large door opening into one of the shed compartments, on the floor of which were the bricks to be taken on. The driver took the bricks in the order they were given him with no thought of the order of delivery later.

Two men did the loading, using the hand-loading devices shown in Fig. 2. These consisted of a double bar A adjustable in length and held to length by the tightening of a handle B. At the one end was a stationary prong or angle C, while at the other was a double prong D hinged at E and with a handle fastened to it as at H at right angles to the prong. The workmen had the device adjusted to take ten bricks at a time. The prongs were slipped down between the bricks as they lay; when lifting up on the handle H the prongs clamped together through the hinge action of the end claw D and the handle H, and thus held the ten bricks secure. The handle reached to a point over the center of the row of bricks so that the

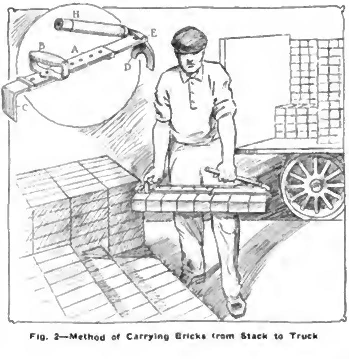


Fig. 2—Method of Carrying Bricks from Stack to Truck

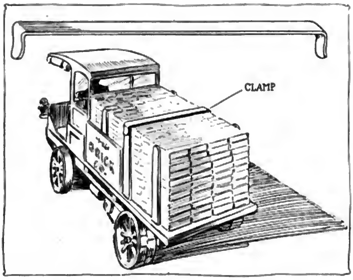


Fig. 3—Clamping Bricks Together on Motor Truck

load balanced nicely, enabling the men to lift the material out much quicker than if each brick were handled separately.

One man stood on the shed floor and lifted the bricks onto the floor of the truck, the other lifted them from here and stacked them neatly. The load was of "Standard" fire brick weighing 7 pounds per brick, so that each lift meant a load of 70 pounds in the loading device. One of these was put on about every 10 seconds. It was noted that the man below, who seemed to be the better and faster worker of the two, took a momentary rest period after each lift, this probably accounting for the fact of his having no appearance of fatigue at the end of the day's work some time later. While the two men worked, a third directed their efforts with not too great an amount of concern, his main business for most of the loading time being that of chewing on a straw.

A Roundabout Way of Carrying

Two-thirds of the load being on, it was found that there were not enough fire brick in this shed to complete the load, so the machine was backed some 20 feet further up the roadway to the door of a freight car. On the opposite side of this car, but not directly opposite the door, was another shed containing the rest of the bricks. To carry the material by this roundabout way two more men were summoned, four men completing the loading of fire brick. In all, 1,250 fire bricks were loaded on, when at 4:45 another move was made to the front shed as at C to take on 200 fancy pressed bricks for another delivery.

These bricks were taken from an exposed pile at the side of the alley, two men working as before, this time three men watching. The entire load was on at 4:56, just 1 hour after the machine's arrival.

All the bricks being on, the body part was put together and fastened. This was a slatted stake body of a size to take a load 6 bricks wide, 40 bricks long and 6 bricks high, the bricks laying edge down and with their length crosswise of the body. It might be mentioned here that a horse load for the city where this truck is in operation is ordinarily 4 bricks wide, 50 bricks long and 4 to 6 bricks high; 800 to 1,200 bricks to a load, while the motor truck carries 1,440 to 1,680, for sometimes a load 7 bricks high is carried.

After the load was on—the end gate having been left in place during the loading—the side was put in place with the end stakes in their sockets. Then the center stake was forced in place and an iron clamp, as in the drawing, Fig. 3, was fitted across the top of the load, pulling the sides together at the center and holding them under compression; this held the bricks from shaking about. Straw was packed between the layers, as well, to prevent injury.

All being ready the driver went to the office at the end of the first shed, remaining 18 minutes. On his return he explained that he had had some words over delivering to a certain point where the receiver was an unprintable sort of a person; which incident merely is mentioned as a sidelight on the driver problem and its relation to the proper treatment of customers.

The machine left the yards at 5:14, having been idle 1 hour and 18 minutes. How much lost mileage of delivery this meant is shown by the fact that 46 minutes later the machine was at the Northwestern Terra Cotta Works with its load, having traveled some 10 miles in all, through traffic nearly all the way.

Extra Handling Because of Improper Loading

After a 5-minute wait for orders the machine drew up alongside the curb, where the bricks were unloaded. It was now found that the fire bricks were for this stop and the pressed bricks for a second stop, so that before the fire brick could be taken off half of the 200 pressed brick on top had to be shifted to the other half of the truck, and then, after the half load of fire brick was off, these had all to be set down onto the empty half of the truck, **meaning the extra handling of 300 bricks because of improper loading at the yards.** The fire brick being the first to be delivered should have been put on last.

The unloading started at 6:10 and was finished at 7:08, two men working, the driver assisting, though not required to, that he might get home earlier. **Probably 20 minutes was lost in the unloading through the improper placing of the fancy brick.** This does not include the energy wasted by the driver in language at the mistake. The helper worked on and said nothing.

This trip brings out only a few aspects of brick delivery, but enough to point to several things to be avoided and a few to be followed in planning motor trucks for hauling this class of material.

A Fault in the Truck Body Design

One fault in the truck body design which might have been improved was the height of the load when on. A flatter load wider or longer or both, would have saved lifting brick to so great a height, as the top of the load when on was some 5 1-2 feet up. If the load had been but 4 bricks high the loading effort expended would have been much less. Also as to loading, as mentioned before, some mechanical device could be designed for use in the yards when more trucks are used in this work. The holding part could be much the same as the hand device shown, but on a larger scale, and some form of crane could be used for the hoisting, with electric power, perhaps. Possibly this might be made an attachment to the truck and assist in the unloading as well.

Horses from the yard just described make a maximum of 22 miles per day, hauling for a distance of 11 miles and back. The average is around 15 miles.

Knisely Brothers, makers of fireproof sash and doors, are using two 3-ton motor trucks for delivery and for hauling to the factory. The machines make about 40 miles per day. It takes about 40 minutes to unload ordinarily. The machines take the place of five single wagons. The average haul is about 5 miles.

On September 4th a delivery of 50 steel sash was made, the truck arriving at 10:01 A.M. It was delayed for 5 minutes by traffic at the entrance to the alley, the street being more than half blocked at this point unloading wagons and piles of materials at the curb, as shown in the drawing, Fig. 3. Another 5 minutes was taken up in getting into the alley, a load of wire being ahead. The machine was at last in position at 10:12.

Method of Unloading Steel Sash

The steel sash with glass weighed 75 pounds apiece. The machine was unloaded by men working for Knisely Brothers engaged on the building, and four men were used in unloading. The driver had instructions to have these men unload from the street if necessary, if there were too great delay and hindrance in getting into the alley. The chief advantage of this delivery was that for the unloading the firm owning the truck had charge of the men doing the unloading and so could unload as they pleased. If there were delay they had no one to blame.

The men took one sash at a time, carrying it some 300 feet from the point where the truck was stationed. For part of the route they had to climb over some timbers obstructing the path. From 1 1-2 to 3 minutes were taken for the trip by each man. The load was completely off at 10:44, 32 minutes having been taken in getting rid of the load. The machine left at 10:46, just 45 minutes after its arrival. Had it been possible to merely lift the sash off the truck and set them on the ground to be carried in later, at least 30 minutes could have been saved.

Shipping Clerk Keeps Track of All Trucks

All Knisely Brothers downtown motor-truck trips to congested points are made in the morning when possible. before traffic gets heavy. The shipping clerk keeps track of every movement of each truck and when there is anything to be hauled back to the plant, 6 miles distant, he calls up the driver with instructions. Motor trucks by this system run loaded both ways for about 50 per cent. of the time. The system in this case fits the truck to just that extent. It will be more nearly ideal when arranged so that the machine can run loaded both ways all the time, if this ideal can ever be realized. The return loads are of copper or iron-raw material for the plant.

In hauling building material to the plant of the Commonwealth Edison Co. during the past summer the second truck owned by this firm did the work of 15 horses. This was on a 7-mile haul loaded one way only, with a 3-ton load.

There may seem to be but little connection between building materials and drugs, but since both are being delivered by motor trucks in these days they come within the range of this article. The gap between the two lines of business only emphasizes the wide divergence of conditions which the same motor delivery vehicle may be called upon to meet and the various classes of delivery which now obtain in each of these branches.

The average drug store of today is a place of small sales with a large percentage of profit, the great gains to be expected from such a trade being hindered, however, by competition of service. The city drug store of today in order to get the trade must be a palace of cut glass and onyx, or gold leaf and glass-topped soda tables. It must look the part of a prosperous and rich concern and, if it does, it gets the trade. This means that the overhead expense is greater in many cases than the real cost of the goods sold. Most of the commodities are package stuff as well and in a large percentage of cases the package costs more than the contents. The drug store is today largely a place of show and soda fountains.

Trucks for Druggist's Service

With all this elegance about them some of the druggists—not all, it is true—absorb an enlarged idea of the importance of their position, and the clerks as well, though men of little education as a class—outside of their own business—are a very exacting class to deal with. Temperamental to a certain extent and used to being sought for advice, the average small druggist or drug clerk in a large store is a man with whom a degree of tact must be used by the wholesaler to obtain and hold his trade.

Largely on this account Fuller & Fuller, a wholesale druggists firm, has found that the greatest gain to them, due to the adoption of motor trucks for delivery, has been through the increased mental capacity and tact of the drivers over the former teamsters. There are fewer troubles with touchy customers and the drivers are themselves easier to deal with.

Delivering within a mile and a half radius from the main store the work can be done 25 per cent. cheaper

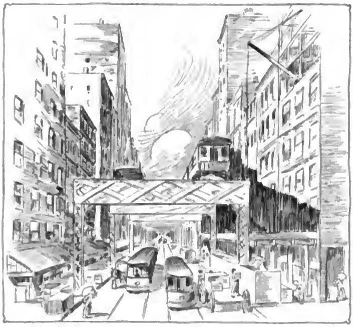


Fig. 4—Traffic Conditions Affecting Loading Operations

by horses, but beyond this point motors begin to pay; the further out the better the showing. One machine running north from the store covering suburban points is doing work which 14 horses could not accomplish. But great congestion, freight depots and long waits, and poor roads make horses more desirable for work in this territory. Altogether it has proved a little costlier for Fuller & Fuller to use motor trucks so far, as only cost figures go, but the difference is more than made up in service. Trucks can always be used for extra runs after the day's work, whereas horses are tired out. A manufacturer might call up and want a barrel of goods in a hurry. With horses the cost of delivery would be $2.00 or $3.00. With motors these quick deliveries are handled between regular trips. Regular runs are completed on ordinary days by 4 p. m. An interesting part of Fuller & Fuller's story is that the machines are old "one-lungers," air cooled. They are plugging along day after day, however, and making a showing equal to many, and better than some of the newer trucks.

It Is the Business That Counts

It is not the vehicle that counts but the business in which it works and its fitness for the work a truck is capable of doing.

A line of retail drug stores uses a small hard tired truck of 1,000 pounds capacity for delivery work between four retail stores and for work between these and downtown wholesale stores some 6 miles away. This car, which in itself shows considerable signs of usage and little care, travels 35 to 40 miles per day. It has been used but one season and yet looks like a four-year-old machine. This is not the fault of the machine for the same make does well in other places. The drug stores themselves are models of cleanliness and up-to-date system and it is to be wondered at that such a shabby vehicle as this is should be left standing for several hours per day as it does in front of one of the firm's best stores. A coat of paint would be a cheap advertisement.

Asking as to the cost of operating the writer was told that it did not take $1.50 per day. When further questions were put it turned out that the cost was at least $5.00 per day, but the management did not seem interested in trying to find out just what it was costing. The chief gain in its use has been in better service, while an actual saving of money over former horse work is claimed.

Trucks for Furniture Delivery

A third line of truck operation, to furnish another angle of truck service, is that of furniture delivery. One example only of this service will be cited in this case as a general indication of conditions.

Revell & Co., furniture dealers, operate five 3-ton trucks. These run as high as 50 miles per day, each run being from 5 to 25 miles, with an average of 40 stops per day. Three hours are spent in loading each day. This long time is due largely to too small a shipping room. On this account the pieces for the load have to be collected mostly while the truck is waiting. This necessitates the driver or helper making trips to various departments and floors of the building to bring the articles down to the truck, as but little of it can be had ready in the small shipping room space that is available. Space is so valuable that the shipping areas are always left as small as they can possibly be made to. Horse methods allowed this, but with motor trucks coming it will have to change. In theory nest bodies would be almost ideal for this class of delivery work, but lack of space will not allow of storing an extra body.

These vehicles cover all of the city and vicinity within a radius of 8 miles from the store and in some cases further than this. There are no fixed routes for truck running. Two men are taken to a machine. Speed is kept down to 15 miles per hour. Tires last over the 8,000-mile guarantee. Block tires are preferred on account of winter work.

Revell & Co. have one scheme in use which saves a few minutes of delay each day. **While trucks are loading at the curb drivers attend to the small repairs and adjustments which the machines may demand.**

On a recent morning two of these trucks were drawn up at the curbing at the side of the store loading. One machine had but a few pieces on, with one man working at further loading. The driver was at work at the front end, the hood of the machine being off, while with an electric soldering iron connected with the store by a cable stretched across the sidewalk, he was soldering a loose fixture on the radiator. **Thus two operations, loading and repairing, were going on at the same time.**

The second truck, with more of a load on—one man loading here, too—was being adjusted by the second driver. He was sitting under the truck on a small piece of carpet laid on the asphalt, adjusting the chains.

The loading in this case took 2 hours in all.

Difference in Requirements and Service

Each new kind of business and hauling which is brought up shows difference in requirements and service which are either for or against the motor vehicle, though in the examples that have been taken they are generally to the advantage of the motor truck.

The commission business offers many opportunities for the delivery of goods by motor and yet each separate store has its own special lines where the truck again can fail or make good.

R. R. Anderson has a comparatively small commission store in a Western city, based on Mr. Anderson's preference for a small business which he can superintend personally and thus be sure of every customer's getting satisfaction rather than to have a larger store with less service to the customer. His business is built up largely on personality and on the customer's knowledge of his way of doing square business. As a part of this extra service and attention to customer a motor truck has been put to work delivering. It is a 1½-ton machine on pneumatic tires and does from 30 to 50 miles per day. **To show just what the use of the machine has meant to the firm the summer melon trade gain has paid for the running of the truck for the year.** Through making a trip to the yards with the motor and bringing back 200 melons at a time melons were bought 10 cents cheaper than they could have been purchased on commission row. **In some cases**

this firm has sold melons to customers at a lower price than they could have bought them otherwise at wholesale.

Besides the saving on the melons, the trade of several large suburban hotels was gained through the melon lead alone. Before the motor truck was bought all melons were shipped to these suburban hotels by express with consequent loss and delay. On one shipment 25 melons were lost through delay. **The motor has done away with all spoiling of melons in transit. In winter there has been a similar advantage in getting goods to distant points without freezing.** On one occasion a load was delivered to a point 15 miles distant when the thermometer was at 10 below zero after the railroad had refused to deliver on account of freezing risk. The 3-ton load was carried safely without freezing a single item of delivery. The only precaution taken for winter work was the lining of the enclosed body with building paper. The trip took 1½ hours.

Sureness of Delivery Gained Extra Trade

This sureness of delivery gained the trade of the Northwestern Railway dining service, necessitating a 6-mile haul with perishable goods in all kinds of weather. This has been done with no complaint or loss. Horse vehicles could not do this work in winter. A disadvantage of this work for the motor truck is that, although the run takes less than ½ hour, the truck generally waits 1 hour before it is unloaded.

A boy is carried to assist the driver on the truck. Tires last 11 months. It cost but $23.50 for the running expenses of the machine during the month of August last.

An interesting item was brought out in regard to the attitude of customers toward the truck when first bought when **several of them remarked on the firm's prosperity in being able to buy such a machine and supposed "that their trade had helped to pay for it."** They did not see that its use was to save them money, but took it as a luxury for their business.

Motor trucks in delivering for hundreds of small stores, a great many of which are far from being hustling or enterprising, throughout our big cities, would have to overcome a great many obstacles. The longest haul would be not over 1 mile and each trip would include probably ten stops per mile. A horse and wagon would not be as cheap as are the three boys used at present so that a motor vehicle would have to make a fine showing to make good at all.

Contract Delivery Final Outcome for Small Stores

Some day a vehicle may fill small store service, but it is likely that contract delivery will be the final outcome where one vehicle will serve several stores.

Such a package delivery has been started by Hogan Brothers, who aim to serve such firms as have been indicated and others who prefer to have their packages delivered at so much per, to bothering with a delivery equipment.

The package cars for Hogan Brothers make from 75 to 100 miles per day and are small-unit 500-pound capacity cars. As many as 100 stops are made in a rush day.

One larger machine makes a pick-up trip through business districts every 2½ hours, as from these districts most of the trade comes. Four of these trips are made a day—the last at 5 p. m. The car then takes the load to the central garage and distributing station 1 mile away, where the bundles are sorted and distributed to the 5 cars which cover the city. A slip is made out in duplicate for each package, one kept on file at Hogan Brothers' office and the other given to the driver. On return the driver must show a receipt for every package delivered and account for any not delivered.

Trips Made on a Package Delivery Car

Stop.	Remarks.	Length of Stop.	Time.
	Leave garage		9:03
	Delay 4 minutes by open draw		9:15
1		2 minutes	9:21
2		2 minutes	9:27
3		2 minutes	9:29
	Check route and bundles for next stop. Driver uses directory 3 minutes.		
4		2 minutes	9:54
5		2½ minutes	9:57
	C.O.D. order. No change on hand. Package retained.		
6		2 minutes	10:00
7		2½ minutes	10:04
8		2 minutes	10:10
9		1¼ minutes	10:17
10		3 minutes	10:26
	C.O.D. order. No change on hand. Package retained.		
11		1 minute	10:32
12		1 minute	10:49
13		2 minutes	11:15
14		1 minute	11:10
	Arrive at city center		11:21
	Arrive at garage		11:46
	Distance, 30 miles; stops to deliver, 14; average stop about 2 minutes.		

In the original collection of the packages the driver for Hogan Brothers gave receipt for every package he took to deliver, so that in this way track is kept of every package handled. Every man in the employ of the company is bonded. Sometimes these men handle $1,000 per day C.O.D. orders, according to the inclination of the manager of the firm.

A special delivery car leaves the garage at 6 p. m. and delivers the same night. There has been but one failure in this, when a driver was arrested for speeding on a Saturday night.

Seven Cars Running 15 Hours a Day

Seven cars are running in all, in use 15 hours a day. A little later the firm expects to operate them 22 hours a day, doing bulk collecting downtown at night.

At present, with the service in its infancy, the cost of delivery is 11 cents per package. As soon as the service is really extended this can be cut 1-3. The firm is increasing facilities to cut the costs.

The whole plant is run in three departments: Contract, delivery and operating. The contract department is the section which gets the business and drums up trade; the delivery department is the part of the organization actually engaged in carrying the package and other merchandise which the firm is to deliver; the operating department is the mechanical corps which is responsible for the mechanism of the trucks. Each department is under experts and a mechanical engineer has charge of the shop.

In the first place young men were used as drivers, but these have been found to be too irresponsible. They are being replaced by married men throughout, men who, it is figured, will have more tact than the boys have had.

As to cost charge for delivery, the usual method is on a zone basis of distance. For a 1-mile radius the charge is 10 cents per package, to the city limits 15

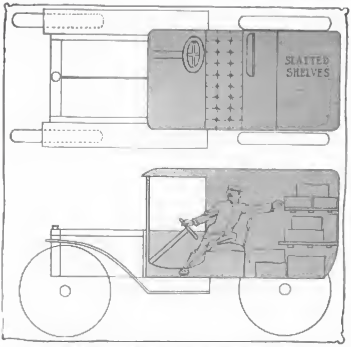


Fig. 5—Body Construction in Package Delivery Vehicle

cents, to a distance of 12 miles 25 cents and for any C.O.D. packages 5 cents extra is charged. An extra charge is made above 100 pounds in the weight of a package.

The body arrangements of these small trucks allow of entry from but one side. There is a back only to the driver's seat and no door in the rear of the car. From the seat by a little stretching the driver can reach any package in the car. To take care of extra packages shelves made of slats are fitted, as shown in Fig. 5, so that the packages may be sorted and always available at a moment's notice. At no time on the run was more than 5 seconds used by the driver in getting his package. The motor was left running during the whole trip.

The following examples of truck service show in a still more convincing manner the vast range of business to which the motor truck has to cater. It is truly an elastic transportation limb that can be used with the same high degree of efficiency for the widely different delivery of varnish, sliced beef, cigars and tools!

Truck in Service of a Varnish Company

The Murphy Varnish Co. has in use one 2,500-pound motor truck, one 1-horse and two 2-horse vehicles. The motor is making from 135 to 175 miles per week, no record being kept of daily mileage. Five to eight trips are made per day, the machine doing the work of two teams. Two hours per day are spent in loading and in idle time. The actual loading time in each case is about 15 minutes. Loading is done by hand, the truck drivers assisting. Tires average 10,000 miles front and 8,000 rear, the machine being repaired and garaged under contract at a local garage.

The two-horse team is used for work averaging a 1- to 2-mile haul, the single rig being for near-at-hand delivery. The motor truck handles all the work outside of the 2-mile radius and is doing the tonnage work of two teams with twice the mileage. This firm also is enthusiastic over the work of the motor and is figuring on adding to its present equipment.

Horses average 12 miles per day with a 3-ton load, though 9,600 pounds has been carried on a 6-mile haul by one team. Teams cost $6.00 per day under contract.

The George Foell Supply Co. has put a motor truck to a new use. This firm puts up a special grade of dried beef, sliced fresh every day, and sells it in paper cartons direct to grocers, and delivery is made each morning. When the business first started a trip was made every day with a 1-horse outfit, a fast horse being used. A run of 14 miles with 45 stops was made and then a fresh horse was taken on for the return trip. The work was so hard that horses were sold at the end of every 6 months. With increasing business horses were no longer possible, so the firm bought a motor truck of 1,500-pound capacity on pneumatic tires.

This machine covers 60 miles a day regularly, making 55 to 90 stops per run, being actually in use 11 hours a day. At each stop the goods must be sold as well as delivered, which makes these waits about 4 minutes each. Delivery is made to all of the large grocery stores. The machine leaves the store each morning with a 1-ton load, reaching speeds at times of 30 miles per hour. Speed is the great object in this delivery work. By doing all the work with one truck Mr. Foell is able to drive it himself and personally superintend his relations with every grocer served.

Cost of Operation $8.00 Per Day

The cost of operation per day is about $8.00 and the trip is done in 11 hours. With the two horses formerly used the trip took 17 hours.

The machine used has an enclosed body and the packages—paper cartons of uniform size—are arranged on shelves behind the driver in such a way that he can reach every package from the seat without dismounting. To save 1 minute on a stop with the 90 stops a day sometimes made would mean 1½ hours saved in the day.

This unique use of a truck in a small business opens up a selling system for others to follow in other lines, for there are many specialties and novelties which might well be handled in this way.

A firm of cigar dealers use a 1,500-pound truck with pneumatic tires. A one-horse wagon is used for downtown work. The machine makes 50 miles per day, averaging 200 stops. A boy goes with the machine to facilitate unloading. The average stop is between 1 and 2 minutes.

Cost of Delivery Per Package 8 Cents

Loading at the store takes ordinarily ½ hour. The load is made up of boxes and cases of cigars and the cases weigh about 300 pounds. The cost of delivery per package is figured at from 8 cents to 12 cents.

The machine makes two trips a day covering the city, the first at 10 a. m., the second at 2 p. m. The barn is located 4 miles from the main store, the machine returning to the barn each night without returning to the store; this saves extra mileage.

The horse in the same work averages from 8 to 12 miles per day in a congested district, with a load of 1,000 pounds. The firm is very well satisfied with the work of the machine, the cost per package being cut down and the mileage increased.

The Samuel Harris Machine Tool Co. is using one

1-ton truck and two-horse wagons. The motor covers from 25 to 50 miles per day, making 35 to 40 stops, mostly at small manufacturing plants, these stops necessitating a delay of from 5 to 10 minutes in each case. Half an hour is taken to load, most of the load being light material. Hard tires are used, which last to the 8,000-mile guarantee. The machine is doing the work of two wagons and is satisfactory in every particular.

The horse wagons in the same kind of hauling work with an average ½-ton load making 10 miles per day. The horse cost per day is about $5.00; the truck costs about $8.00.

So far a number of diversified lines of motor truck use and possibilities have been dealt with. More could be listed without end, but enough have been given already for the purposes of this article to point out the fact that **in no two cases is a truck called upon to perform the same service, and hit-and-miss, it must make good in all.**

Old Delivery Systems Must Change

In furniture and department store work these vehicles are successful in spite of a large percentage of idle time, their chief gain over horses being their ability to keep to schedule. Large stores of this kind require with horses substations at outlying points, adding greatly to the expense of delivery; with motor trucks these may eventually be done away with. **The delivery systems of firms of this kind will have to change materially before trucks will be operating in their service as they should be.**

In hauling building material the size of the motor truck load is a large factor, especially in Chicago, where a two-horse load is often as much as 5 tons. Railway yards are near at hand in this city and too congested for motor truck operation, but building material yards can be well served by motor trucks which can thus operate on fairly long hauls as a general thing. **The yards will have to be changed and up-to-date loading methods adopted to make efficient delivery possible.**

Receiving Conditions and Unloading Devices

As to receiving conditions, for downtown work there is much of waiting to be done behind lines of horse teams, but where firms have their own men on the job, like Knisely Brothers, to do the unloading, even if the truck has to be unloaded from the street, trucks can be made to pay.

Unloading devices will come into being in this work eventually. It may be necessary in big office building operations, where vehicles drive into the ground floor of the building to deliver, to leave a wider open space for a motor than has been left for horse wagons, though the space can be shorter. Brick yards can be arranged for motor truck work in much better shape than are the present horse yards, allowing for the longer turning radius of a motor truck which points again to the advantage of a truck which can turn within narrow space. With motors there will be less loafing time for yard hands.

As yet the drug line is not large enough in its vehicle use to have demanded any reorganization. **For retail drug work the chief value of the motored machine so far is for work between the stores in outlying districts and downtown supply houses. For this work small machines are demanded but contract work will probably be the eventual solution.**

While firms handling such articles as cigars, small package goods and specialties are using their own machines at present to cover the whole areas of our larger cities, it is probable that by contract work later, conducted by firms making a specialty of hauling and nothing else, costs can be materially cut down from present ones and service hurried up considerably. The exceptions will be cases like the dried beef dealer and the commission man who want to oversee the whole of their own business, and in those lines where the driver sells as well as delivers.

Commission work of the future may have motor trucks provided with refrigerating systems and frost-proof bodies for winter work.

One of the chief advantages of the motor trucks for grocers has been the possibility of stores in outside and suburban districts buying their stock at the downtown market in the early mornings and having it on the spot in time for early trade, instead of depending on hucksters who sell at a higher price goods not so fresh. **It is impossible in certain cities for many firms using horses to get to the downtown markets for their day's supplies; with motor trucks this is easy.**

The small dry goods store, shoe store, men's furnishing store and the like will probably eventually be served under contract by package delivery companies.

Conditions Different in Every Example

In this article but a few cases have been taken and lessons drawn from each case, but each new example which one might study would show new lessons, and many firms in the same lines of work in the same city might be meeting with conditions exactly opposite.

For the motor truck and its correct use there is nothing sure but to study the particular problem and field which the machine will have to meet and fill and, after selecting the machine which will fit into the present system with the least change of system, alter then to fit the truck until all work in harmony, no time is lost which can be used to advantage, and the truck is working to a full tonnage and mileage capacity.

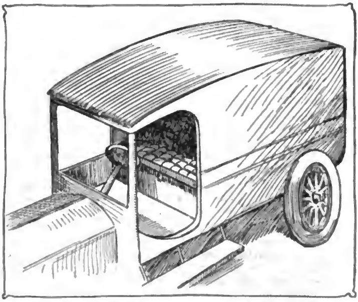


Fig. 6—Small Package Delivery Vehicle, Closed in at Rear

Humanities of the Electric Battery

A Guide to Battery Care and Charging Methods

BATTERY care is the most important item to be considered in operating an electric vehicle and it is the item that will have the greatest effect on the cost sheet. The most important point to be considered in connection with battery care is the charging method, and many operators of electric vehicles are daily losing money because of their disregard of this most important point; batteries are charged without the slightest consideration of wear and tear, and effect on service. Users must understand the basic principles of battery operation and care, otherwise it is impossible to get long life and efficiency from a battery whatever its make and reputation. The right number of kilowatt hours of electricity should be put into it at the proper rate; the individual cells should be tested at regular intervals; sediment should be removed from the bottoms of the jars, and a little distilled water occasionally added to replace evaporation. These hints if properly and regularly applied are sufficient to keep batteries in thorough order and working at highest efficiency.

THE most important item to be watched in the operation of an electric vehicle is the battery care and the most important part of this branch is that of charging method.

This statement was made recently by the manager of a company that is one of the largest users of electric delivery wagons in a leading city.

"A battery is like a man," he continued, "and if you treat your vehicle batteries as you treat yourself you will get much longer life out of them than by any other easily understood system. The electric battery is a peculiar proposition at best but sometimes it almost seems to have a personality. If a man gets cold he is hindered in his work. If he eats in the cold he has less benefit from his food and cannot respond in work. House and feed him in a warm dining room and he responds in extra efficiency.

"Work a man to his limit and send him home at night without another ounce of work in him and then stuff him full of steak and onions and a full meal and he will be sure to be absent next day on the complaint of a stomachache. Work the man but to capacity, however, and he will come back next day after meals and a sleep with all his original snap and vim.

"If a workman stops between meals and takes a lunch on the jump between spurts of work his efficiency is hindered.

Rules of Men's Efficiency Apply to Batteries

"Now just see how these rules of a man's efficiency apply to battery efficiency as we have found it to work out with our 60 trucks:

"'If a man is cold he is hindered in his work.' We find that we get 60 miles from batteries in summer which give only 45 when charged in the cold and run during the winter. If you charge them in a warm room, however, when the batteries are warm then the mileage will almost equal figures obtained during the summer. You may charge batteries to the same figures in the cold as you are able to do in the warm room, but the mileage obtained will be less with the charged in the cold cells.

"If you work a truck to its limit, bring it in at night without another mile of current in the cells and immediately stuff in a full charge of current, you are doing to the battery what a boiled dinner will do to a dead-tired man: your batteries will have a stomachache, which will make them sluggish all the next day, no matter how well you charge them. Indeed you will never get back the life and vim you had before.

"Five miles of current should be left in the batteries each night, and then the cells will renew their old strength and life.

"All a battery needs is a first injury and and that will show like an overloaded rubber tire that bad treatment will always affect the resiliency and come-back of the cells. Strain the plates once, and they can never be brought back to their original efficiency.

"If the workman lunches between meals his digestion is hindered. He may not know it but the damage is there, in cumulative amount as the sin is repeated. If a battery is 'boosted' between charges it has the same effect as the between meals trick of the workman. A battery is made to be charged and then discharged, and any change in the routine and schedule will work a cumulative injury.

Shift Batteries Instead of Boosting

"In our plant it is often necessary to work a truck to greater mileage than the one battery will give. We do this by shifting batteries and never boost with current except in the case of old batteries on their last legs. These we treat in any sort of way to get the last mileage out of them.

"Although our cars make from 40 to 60 miles a day our batteries last a full year on the average. The life of a battery depends entirely on how it is handled in the garage and I would place the garage handling of the batteries in charging as the most vital factor of electric truck operation. Next to this would come the use of the battery on the road.

"Here we have the driver problem. We can put one man on a truck one day and get 45 to 50 miles out of the truck he is driving. The next day, the same car with the same batteries and the same charge, may not make over 28 miles with a new or poor driver. We change drivers about from car to car on this account.

"The one driver may drag his brake unconsciously all day long, or may keep power on right to a stop, and then jam on his brakes. Another may always guage distance and coast to a stop without using brakes. Some 15 feet of power travel can be saved per stop by this alone, and if 120 stops a day are taken as an average almost 100 miles a year can be saved following this calculation. Again, a driver can save current by choice of route. The driver problem is closely associated with sucessful electric operation."

Basic Principles Must Be Understood

The conclusions at which this manager has arrived serve as a clear and easily comprehended analysis of the basic principles of battery operation and care, and without a knowledge of these principles it is impossible to get long life and efficiency from any battery, whatever the make and whatever the reputation. Users of lead batteries have arrived at practically the same conclusions, and the Edison battery requires exactly the same amount of care and common-sense in operation.

To take one other instance to substantiate the truth of this assumption, the owner of a large department store using electric vehicles, found that a great deal of current was lost on account of the charging being done in a cold room in one of the barns. Consequently, it was found that but a small portion of the mileage obtained during the summer months was forthcoming, and the fact was made clear that this was not due to road conditions, but simply to the method of charging. The owner set about to remedy the situation. He boarded in a certain part of the barn, and thus protected it from the wintry blasts. It was a step in the right direction, and although the room could not truthfully be said to be warm, a difference in the mileage obtained on the same charge as had heretofore been made was at once noted. A few boards nailed to the walls of a barn proved the case, and a brand new garage is now being fitted up, so that all the vehicles will be suitably accommodated and charging done under correct conditions.

This owner found that the custom of boosting the charge at midday had no ill effect on the batteries, which in this case were Edisons. They have been in use for 11 months and are as good as new.

Instruction Booklets for Battery Users

What the owner proves after mishap the manufacturer has foreseen, and it is only logical and natural that he should seek to educate the user of an electric battery in the mysteries of charging. It is to the advantage of the makers that good service is obtained from their products, and accordingly, in some cases, purchasers are furnished with instruction booklets, with directions and rules, dial models as instruction for meter reading, and charts of various kinds for keeping costs. Two of the latter were reproduced in the November issue of THE COMMERCIAL VEHICLE, and this month we print below an extract from instruction booklets issued by the Commonwealth Edison Co., which serves to show how important it is that a battery should be rightly treated, and that sane methods of charging should be adopted.

It is wise, perhaps, to preface this extract by saying that the user of an electric vehicle does not seem to have so careful an eye on his current—whether he is wasting, whether he is overworking, whether he is using the best methods of regulating cost as the user of electric current in a larger sense, for light or for power. In the latter cases, waste can more easily be recognized, but not more easily remedied. Once seen, and the chief bother is over. And here's another vital fact—the main guide is the monthly cost sheet.

The subjoined instructions apply particularly to the lead-acid battery, and the amount of care is really absurdly small when compared with the amount of service obtained. In fact, so well does the usual battery work that some owners have very rashly considered that it needs no care at all. But in such cases, although good service *is* obtained, maximum efficiency is *not*. Any one who puts aside maximum efficiency as an unattainable ideal is unworthy of any kind of efficiency. Records must always be kept of the amount of current used, just as records of the cost of any branch of a business are kept. The working of the cells should be maintained uniform and the acid in individual cells tested at certain intervals.

Charging Method Depends on Battery

It should be recognized, however, that no hard and fast rules can be laid down for charging every kind of battery. The charging method depends on the kind of battery and should be so regulated.

The company from whose instructions we have quoted, recommends that every electric vehicle should be equipped with the following: a voltmeter, to indicate when the battery is fully charged; an ampère meter, to show the rate at which the current is going into or coming out of the battery; a hydrometer, to test the strength of the acid in the battery; and a mileage indicator. A special kind of hydrometer is used, with a scale reading from 1100 to 1300 degrees of specific gravity. The best results are obtained from a battery when the strength of the acid is about 1280 at the time when the battery is fully charged; when empty the gravity usually reads about 1280. The voltage of each cell should be a little over 2.6 volts. The readings of the hydrometer are more to be depended on than those of the voltameter, being independent of the current that is passing through the battery, and also a hydrometer is not affected by the jolting of the vehicle.

Removing Sediment from Bottom of Jars

In a lead battery a sediment is sometimes created by the action of the current on the material of the plates. It is to prevent the interfering of this sediment with the action of the battery that the plates are not allowed to touch the bottom of the jars. The sediment, however, will accumulate and it is probable that after a period of about six months the accumulation will approach the bottom of the plates. This will spoil the action of the battery, so the cells should be cleaned regularly, and the sediment removed before it comes in contact with the plates.

The points to be remembered are summed up: the care of a storage battery consists of putting the right number of kilowatt hours of electricity into it at the proper rate; testing the individual cells at regular intervals to detect minor accidents; removing the sediment before it reaches the plates, and adding a little distilled water occasionally to replace evaporation. These points, regularly attended to, will materially affect for the good the life of any battery.

Rules for the Correct Treatment of Electric Batteries

1. Before starting to charge, ascertain from the vehicle or battery manufacturers the capacity of the battery in kilowatt hours; that is, the number of kilowatt hours of electrical energy that must be put into the battery in order to obtain from the vehicle its rated mileage on one charge.

2. Keep an account of the kilowatt hours used for each charge by reading the kilowatt hour meter installed in each case by the Commonwealth Edison Company.

3. Estimate, roughly at least, if not exactly, the amount of charge already in the battery by testing the strength of the solution in the battery.

4. When the battery is only partially discharged it requires only a partial charge. Charging a battery that is already full is not only a waste of current, but is injurious to the battery.

5. Do not charge too fast, as it shortens the life of the battery; that is, do not as a rule exceed the charging rate recommended by the battery manufacturer for the particular size of battery that is in the vehicle.

6. If a battery is discharged until it is practically empty, it should be charged again, at least partially, without much delay. If allowed to stand for any length of time, more than the usual number of kilowatt hours of current will be required to get it back to a fully charged condition.

7. When a battery is being charged, the voltage of the battery rises and the gravity or strength of the acid in the battery increases. When the battery is being discharged the voltage decreases and the acid becomes weaker.

8. The increase of acid strength, or specific gravity, is directly proportional to the number of kilowatt hours of current put into the battery, the specific gravity curve being practically a straight line. The increase of voltage on the other hand is not proportional to the number of kilowatt hours put into the battery, but increases rapidly at the commencement and also towards the end of the charge, but increases at a slower rate during the middle of the charging. The voltage also varies with the strength in amperes of the charging current.

9. Either a voltmeter or hydrometer may be used to determine when a battery is fully charged, but preferably both methods should be employed, one as a check on the other.

10. Automatic devices for shutting off the current when the battery is supposed to be fully charged may sometimes be used to advantage, but care should be taken to have them in good working order and adjusted correctly. They cannot be relied upon to operate when anything happens to be wrong with any of the cells in the battery or where there is considerable variation in the line voltage.

11. The Commonwealth Edison Company furnishes two kinds of current—direct and alternating. If a battery is to be charged in a district where direct current is supplied, resistance coils are used to adapt the voltage of the line to the voltage of the battery. If the charging is done in an alternating current district, a rectifier or motor generator must be installed to convert the alternating current into direct current of the desired voltage.

12. A certain loss of current always takes place in the charging and regulating apparatus, and this loss in kilowatt hours should be added to the kilowatt-hour capacity of the battery when estimating the number of kilowatt hours required to charge the battery.

13. When charging is done by means of a rectifier, the alternating current switch should be opened when through charging, as a certain amount of electricity is used to keep the rectifier coils excited.

14. The mileage that can be made with a certain number of kilowatt hours of charge can be found by observation and should not vary as long as the conditions under which the vehicle is operated remain unchanged.

15. If the mileage obtainable from a given number of kilowatt hour begins to fall off, the cause of the falling off should be looked for without delay and the vehicle put in good running order.

The Electric Truck in Great Britain

There Are 7,000 Electric Vehicles in Great Britain—Analysis of Papers on Subject of Reduction of Current Consumption, and Other Subjects Read Before the Institution of Electric Engineers

IN spite of the enormous lead that the gasoline vehicle got in the truck field in Great Britain the electric truck is attracting considerable attention at the present time. Up to now the exhorbitant prices of electric current and the positive refusal of certain electric power companies to charge storage batteries have been to some extent responsible for the present situation. Experts in gasoline truck haulage in London claim that gasoline machines when properly installed and operated by trained drivers can work at 30 per cent. lower cost than electrically-propelled machines. There are at present 7,000 electric vehicles of the pleasure and commercial type in Great Britain, representing an income of almost $3000 per week for charging current.

Messrs. J. C. McFarlane and H. Burge recently read papers before the Institution of Electric Engineers on the subject of the electric vehicle, in which they outlined schemes for reducing current consumption and otherwise aiding the electric vehicle. Their treatise included battery vehicles and also gasoline-electric designs. During the last few years much improvement has been made in the efficiency of the vehicles so that the radius of mileage on a battery charge has been materially increased. The battery size has been reduced and the ratio of live load to dead load has been increased almost as the square of the reduction of battery weight.

The authors worked along three suggested lines for improvement: 1. Breaking entirely by regeneration, the battery absorbing the energy returned.

2. Use of a controller in the shape of an efficient rotary transformer or automatic electric valve, only transforming half the power to the wheels, which automatically limits the current that can be drawn from or returned to the battery, and displacing the usual series of parallel type of controller.

3. Use of a motor with a special shunt field winding having a torque speed characteristic similar to that of a series motor.

Battery Vehicle Good in City Traffic

The battery vehicle is the type that best meets the conditions of city traffic, more especially if complete regenerative control be adopted. The scheme as applied to the driving of heavy electric vehicles is shown in the diagram.

The automatic electric valve AB which is one of the Crompton continuous-current converters, is used as the controller, and in addition it possesses the property of acting as a power-limiting device between the battery and the motor. The action of this machine under full-speed conditions is as follows: The upper half A of the armature acts as a motor and is connected across the battery. The lower half B works as a generator and is in series with the driving motor as shown. The potential across the driving motor's terminals is twice that of the battery. The driving motor has two shunt windings. The winding D is connected across the battery and provides constant excitation. The other winding E is connected across the terminals of the B portion of the machine. Winding E assists winding D during the acceleration period and opposes it when the vehicle is running at full speed. Part B of the electric valve is provided with variable and reversible excitation by winding F and this is controlled by means of the regulator shown on the right of the diagram. When the regulator arm is over to the right the voltage due to the half of the armature marked B is added to that of the battery, but when the regulator arm is to the left the voltage due to B is subtracted from that of the battery. When the regulator handle is in the mid position the portion B of the exciter loses its excitation. A winding H is also provided on the field of B in series with the driving motor and this opposes magnetism due to the winding F when the portion B is acting as a generator and delivering power to the driving motor.

The advantages claimed for this arrangement are as follows: During the period of negative acceleration, when the motor is returning energy, the field of the motor is strengthened, so that the electrical braking tendency is largely increased, whereas when the motor is being accelerated and is rotating rapidly its filled strength is diminished so that acceleration is facilitated.

Design of Motor in Battery Vehicles

The design of the motor is such that owing to the action of the field winding E the torque produced is nearly proportional to the square of the current passing through the motor armature. Thus when starting or hill climbing full on the torque is four times that obtained on the level with only two and one-half times the normal current in the armature. The C^2R losses throughout are therefore kept low resulting in a high efficiency even at low speeds. Besides reducing the losses this arrangement is valuable because the electric valve can be made smaller. Moreover, by means of the series winding on the magnet system of the B portion of the machine, the current to the driving motor is always kept within safe limits when it is driving as well as when it is braking. The action of the arrangement can be better understood by taking an actual example.

Suppose the battery gives 60 volts and that the part B of the converter or electric valve also gives 60 volts. Then if B be fully excited with the regulator to the right, its voltage will be added to the battery pressure and there will be 120 volts across the driving motor terminals. The motor will then be acceptable of rotating at full speed, and the voltage across the winding E will be at full negative value, so that the field strength of the driving motor is that due to D-E. If, however, owing to an increase of the load on the driving motor its speed should fall, the increased current flowing through the winding H will reduce the field of the B portion of the machine and thus lower the voltage of the driving motor and in this way danger of burning out is avoided.

Motor Field Strengthened as Speed Falls

When the speed of the motor drops the winding E has its electromotive force reduced, owing to the voltage across the terminals of the B portions of the converter falling. In every case, therefore, the motor field is progressively strengthened as the speed falls. When the regulator arm is fully to the left the portion B of the converter is developing a counter electromotive force of 60 volts or more and there will be no electromotive force across the driving motor, which will

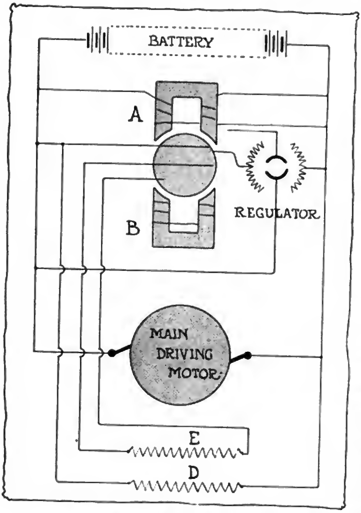


Diagram Showing Driving of Heavy Electric Vehicles

therefore come to rest. When the back electromotive force of the motor rises above the voltage supplied to it, so that the motor is returning energy to the battery, the filed winding H tends to increase to the voltage of the supply in order to limit the amount of current returning to the battery.

The entire control is carried out by means of a pedal and a single reversing lever, which is also employed to start the machine, AB. The pedal controls the reversing field regulator and when in the off portion the arm is over to the extreme left and is allowed to come quickly to this position a very powerful braking effect is produced which continues even after the vehicle has been brought to rest. The latter effect obtained by arranging the resistance of the regulator so that B portion of the converter gives a back electromotive force slightly in excess of the voltage of the battery, producing a negative current of no power through the driving motor and giving a torque in the backward direction. The torque is of such magnitude that it holds the vehicle on a comparatively steep downward gradient, and yet has insufficient power to cause the vehicle to start backwards on a level. If, however, the vehicle is facing up a hill and the controller is in the off position, it is necessary in order to prevent the vehicle moving backwards to depress the controller pedal slightly and so give the driving motor a positive torque, tending the vehicle to drive uphill. This torque can hold the vehicle stationary, thus dispensing with the use of mechanical brakes.

Comparative Gasoline and Electric Costs

In the following table, which is reproduced from the paper, the authors show the comparative cost per omnibus mile of running electric and gasoline omnibuses in London. The following items in the cost of running, it is maintained, are common to both, although not necessarily equal in each type—that is, tire maintenance, drivers, conductors, body upkeep, traffic, expenses, washing, rent, rates, water, gas and lighting, depreciation taxes, supervision and establishment charges. Other items, which are widely different in cost, are given in the table, which also shows the weights of the various mechanical parts of an electric omnibus including complete chassis, tires, electrical equipment, etc., and weight when carrying its full load of passengers.

Speed Automatically Adjusted to Gradient

It will be seen that a vehicle equipped with such a system has the advantage that the speed is automatically adjusted to the gradient of the road. An omnibus constructed at Chelmsford and equipped with the system outlined above, is now running in London and is said to conform in all points with the Metropolitan police regulations. When loaded it has a total weight of not more than 6 tons. It is fitted with a battery having a capacity of 500 ampere-hours on a 5-hour discharge rate. The battery is mounted in the front position usually occupied by the gasoline engine and in consequence no swinging bolts or clamps are required for its support.

In the early part of the paper the authors show that there are two conditions necessary and essential to successful battery traction for heavy road vehicles. In the first place, the charging stations must be within a definite range, and secondly, the battery should always be kept under the supervision of the makers, otherwise the cost of its maintenance would be prohibitive. It is obvious, therefore, that the electric vehicle is unsuitable for traveling long distances or for working in outlying districts. For service of this kind the authors recommend the use of petrol-electric vehicles.

According to the authors' scheme for the latter vehicles that previously described is modified by reducing the battery to one-fifth of the capacity of that of the purely electrical bus, and by adding a 9-horsepower air-cooled engine. The method of operation is very similar to that of the other scheme.

Cost of Electric and Gasoline Buses

	Electric Vehicle Cents per Omnibus Mile.	Gasoline Vehicle Cents per Omnibus Mile.
Battery maintenance	4.0	....
Power of gasoline	1.0	2.50
Chassis maintenance	.2	....
Lubricating oil and paraffin	.02	.44
Vehicle lighting	....	.2
Insurance, not including third party risk	.2	.4
Washing and preparing for running	.34	1.
	5.76	7.34
Depreciation	1 44	2.06
Comparative cost	7.20	9.40

The following table shows the weights of the various parts: (112 lbs.= 1 cwt.) (28 lbs. = 1 qr.)

	Cwt.	Qrs.
Battery, comprising 28 cells, 500 ampere-hour capacity, including acid, terminal connectors, at 75 pounds per cell	19	0
Battery case complete, including lifting hooks and eyes, cover and bonnet	2	0
Electrical equipment, complete, including electric valve, motor regulator, starter and wiring	7	0
Body, including destination boards, driver seat, circuits fire extinguisher	19	3
Tires	4	3
Wheels	5	1
Back axle, including cardan shaft, differential reduction gearing and ball bearings complete	4	2
Front axle including all ball bearings	1	1
Steering gear complete	1	1
Chassis complete, including springs and all attachments for springs	7	1
Two sets of mechanical brakes, including brake drums, levers, rods, etc.	1	2
Total dead weight	73	2
Total live weight, 34 passengers, driver, conductor at 10 stone each	45	0
Grand total	118	2

The Editor's Viewpoint

THE EDUCATION OF THE BUYER

PERHAPS the two most important points that should receive due consideration from all those connected with the motor truck industry are the education of the buyer and the education of the seller. But the question may be asked: If both buyer and seller are to be educated, who is to be the teacher? As a matter of fact, the education lies purely in taking a common-sense view of each case, and the educational forces should be self-impelled and self-directed.

Buying a motor truck is, in its truest sense, a business proposition. A motor truck must be bought with a hard head, and there must be no sentimental buying. Before purchasing, before settling upon the transformation of horses into motors, before figuring cost on each side, the transportation problem must be definitely solved. That is to say, the one and only means of transportation under special circumstances must be settled upon, and the application of that means of transportation must be definitely systematized. Take, for instance, a maker of furniture. At his factory the manufacture of the furniture has been reduced to a system, each day so many pieces of furniture are turned out, each day so many pieces must be shipped to all parts of the country, to supply *a regular demand*. His problem is to have a system of transportation that shall be capable of taking his products to their final destinations in a minimum time, at a minimum cost, and with minimum risk of damage; this is his definite transportation problem.

Then he must ask himself what kind of a wagon he wants, what size it should be, how many he requires, what speed per hour should they be able to give, over what kinds of roads will they have to travel, what weight will they have to bear? This operation will be mathematically transforming the problem into figures; these figures will represent the ideal system at which he is aiming.

The question should then arise: How much money have I to spend on purchasing such means of transportation, and how much money can I set aside per annum for the upkeep of that system?

Thus, the business man will have his problem, in figures, and the best available means of solving that problem, in figures. Of course, when arriving at the funds at his disposal for this item, the money obtainable from the disposal of a system that is to be discarded will be accounted for.

So far, the buyer has been investigating personally from the inside only. He will now extend his inquiries on the outside, armed with these two cold facts—the knowledge of his transportation problem, in miles, measurements, weights, etc., and the quantity of his available money, in dollars. First of all, he should examine what other men in his line of business are doing; there is always a great deal to be learned from competitors, faults if nothing else, and when making this examination he should ask himself a series of questions, based on the fact *that he is making an investigation in economics.*

There must be an answer to every Why? These should be his great questions: Why this? and Why that?

"There is a man using a two-horse wagon, over terribly rough country, and the heavy load can barely make a progress of 4 miles an hour? Why, that will never suit me! Four miles an hour will not suit the output of my factory. I should have to have horse-wagons trailing one behind the other, and still have a block in the shipping department. That system is no good for me. But what about this 1-ton truck? It goes at a good speed. Pneumatic tires, I see! I am afraid that it would suffer terribly under the strain that I should put on it, and over those hilly bits, too. No, *that* won't do either. But this 5-ton truck that Smith is using seems a good, sound proposition. His work is the same as mine. He is turning out about the same amount, and yet—his profits I know are less. It is evident that something is lost somewhere, and I think I can see that where. I time the loading of this truck, and it takes 2 hours, two men working all the while. That's where the time is lost, and dollars, too, if Smith only knew. He might just as well return to his horse-wagons; then, at any rate, system and delivery will correspond."

Thus, the business man will learn. He will apply the details of other transportation problems to his own, gather them together by connecting threads into natural groups—loading facilities, time schedule, speed of delivery, etc.—and finally lead them to the solution—the motor truck.

At this stage, the owner will know what he wants and he will know what to avoid. He should then learn what there is offered him by way of a paying answer to his problem. He should visit the manufacturers, and he should ask questions. By no means the easiest step is the selection of the right makers to call on or to write to. Expositions are valuable from this very point of view; they give a chance for a man to see all and to select those which he considers most favorable. He must give due thought to how high-powered a machine he wants; this he will get from an examination into that first amount of data he obtained by his mathematical reduction of requirements to plain figures.

He will presumably go into a showroom and he will begin asking questions; his questions should be dictated by the knowledge of the facts he has personally encountered in his examination of other men's problems and their methods of solving them. And here his chief difficulty will arrive, for if he has educated himself, if he thoroughly understands his own proposition from A to Z, if he knows how other men have solved somewhat similar cases, yet at the same time recognizes those essentials in which his own problem differs from such cases, if he has made a study of his figures, his mathematical expression of an economic situation, if he adopts the subject as a strictly business proposition and rules aside all personal prejudice—in fact, if he has mastered an understanding of his own *requirements,* he will generally find that he has to deal with an uneducated salesman, that is to say, a salesman who does not look at the matter as a branch of economics, but who regards the purchase of a truck as almost similar to the purchase of a pleasure car.

THE EDUCATION OF THE SELLER

THE seller must be educated as well as the buyer. He must be able to meet the buyer on equal ground. But as every buyer is different, and practically every transportation problem, although allied, is different, his task of self-education will be infinitely harder than that of the buyer who has merely one branch and one phase of business—namely, his own—to consider.

A buyer comes to a salesman to learn, and he must learn truth. The salesman must know exactly the service for which the truck he is selling is most fitted, and he must also know the services for which the trucks of his competitors are most fitted. He must never belittle his competitors. The suspicious buyer—and nearly every *business* purchaser is suspicious—will at once smell a rat. He will find, if he adopts as truth the salesman's deprecating remarks relative to another make of trucks, that that make of trucks is falsely advertised. This fact will breed further suspicion in his mind that the very truck he is intending to purchase is also falsely advertised.

The great drawback to the prosperous growth of the motor truck industry is a lack of co-operation among the makers; the salesmen are the vocal organs of the manufacturers, and it is they who should usher in that co-operation.

All that the business man wants is facts. If a salesman should recognize even after a merely casual estimate of his client's proposition that the truck he is selling is not the right one for this special case, *he should say so,* he must tell the intending customer outright, and, if possible, give him valuable advice on the subject. For if the salesman sells a truck that is not going to work at high efficiency and that is eventually going to be proven valueless, then he is doing serious harm to his company and to the whole industry, because he is painting the motor truck in false colors.

Time after time the motor truck has proven, and is proving, that it can encounter any proposition, and if common sense is used by its manipulators, can render entirely satisfactory service and can become a paying consideration right along. Read the leading article in THE COMMERCIAL VEHICLE, this issue, and there the fact will be made clear. From the handler of huge machinery down to the man who delivers the most delicate materials, all have found that the motor truck is the means of delivery that pays and gives satisfaction to customers at the same time.

Educated buyers and educated sellers will heave the growing industry to the crest of the wave of ultimate prosperity.

AFTER THE TRUCK IS BOUGHT

THE buyer, after he has come to a final and sane decision, will pass through a transition. He will feel the heavy initial expenditure, and he will begin to find that expenses are mounting. His education is not complete; he must make a more minute study of his problem now the means of solving it are in his hands. If he does this, he will almost at once find that the motor truck is a reformer having an influence over every step in his business. Delivery is the last step in an industry; the supply of raw material is the first. Either of these misdirected will produce confusion all along the line, either forwards or backwards as the case may be. The owner will find that if his motor truck is going to be the key to his problem he must suit his business to the motor truck. Horse-pace methods must be flung to the winds; horse-pace men must be discharged; horse-pace internal systems must be revamped. The motor truck is a Dumb Accelerator.

Manifold are the results. Production grows because of greater rapidity in manufacture, or retail selling grows because of superior service afforded by the motor vehicle. The business will become known as one that conforms to the times, that keeps pace with progress, that puts the customer first. The motor truck is the foe of slipshod methods.

The maintenance and operation of a fleet of motor vehicles is no easy job, and it is a subject that should receive the most careful study. It is the man who makes that study who gets the greatest efficiency from them.

There's one other point—it is to be recollected that the big change of internal systems to meet the requirements of external systems cannot be made in a day and should not be made without some definite proof that the existing conditions do not meet such requirements. A man in business should always be on the side of saving expense and consequently should make a close study of his horse-wagon system before he introduces his truck system so that he may be ruled in his choice of a vehicle by the thought that he may save unnecessary expense by retaining, as far as possible, that horse-wagon system; he need only modify it at certain points.

The motor truck user should be a man capable of looking far ahead in the commercial world. Let him just consider for a while the tremendous opportunities that are going to open before him and other keen business men with the adoption of the motor truck. It is only logical to assume that when the motor truck has once and for all proved its superiority over other hauling and carrying apparatus, and when the present generation of horses and wagons has departed this life, that loading facilities, freight terminals, railroad schedules, etc., will all be modified to meet with the demands of the motor truck, if not by the will of the authorities, yet by the pressure that will be brought to bear on the situation. Every man who buys a motor vehicle is aiding that movement. He is casting his vote for reforms in every branch of transportation work. He is ranking himself with the disciples of a new movement. And he will receive his reward in better service, satisfaction to customers and extension of market.

SYSTEMS *for* MAKER *and* USER

Keeping Track of Cost of Operation

System Used by a Large Department Store

THE cost sheet is the lighthouse by means of which the user of a motor truck may steer clear from the breakers of reckless and unnecessary expenditure. To continue the simile, the working of this light must be so organized that there may be practically no risk of its failure at an inopportune moment. Any defect in the apparatus would mean a wreck.

System is the backbone of every organization, and it is useless to emphasize this point, because it is now everywhere accepted in the modern business world. System, applied to keeping costs of operation and maintenance of means of transportation, brings about an almost immediate result. The systematized cost sheet will show, at a mere glance, that in such and such a direction the motor truck or other means of delivery is consuming a greater quantity of money than it should; it shows that service from the vehicle is regular or irregular; it points out the necessity for the systematization of delivery trips, for the reduction to a minimum quantity of the number of stops; in fact, it is the one true and unfailing guide to the operation of a firm's delivery and transportation system.

It can very readily be recognized that if the cost sheet is a mere bewildering hotch-potch of figures, with no clearness, no method, giving evidence of incompetency, waste, and other deteriorating influences, then still more so will the operation of the vehicles be ill-managed, and still more will that indefinite kind of management result in annual loss. The cost sheet is the starting point of system, and if the start is badly made, then it will have a degrading influence on the succeeding operations, and finally result in a perfect chaos of befuddled ideas.

The Cost Sheet Varies with the Service

A cost sheet suitable for every kind of business is not to be had, because just as the operation of a motor truck depends on the service for which it is intended, so does the construction of the cost sheet depend on that service. But there are certain rules which apply to all cost sheets, and the most apparent of these may be listed as follows:

1. The cost sheet should be *analytical* and *synthetical* at

MOTOR DEFECT CARD

INSTRUCTIONS: Drivers must report on this card, upon each return of car to Garage, all defects or other trouble with car occurring on date stated below, and before leaving the premises hand same to Foreman on duty, using reverse side if necessary.

Cab or Truck } No.................... Date.................... 191....
Time.................... A.M.................... P.M.

By ....(Driver)

STATE BELOW PARTS REQUIRING ATTENTION:

1 ....
2 ....
3 ....
4 ....
5 ....
6 ....
7 ....
8 ....
9 ....
10 ....
Received by.................................... Time..............
Repaired by..
Examined by..
Date....................................191.... Time..............

GIMBEL BROTHERS, NEW YORK

Fig. 1

GIMBEL BROTHERS, 24th ST. GARAGE

REPAIR TICKET

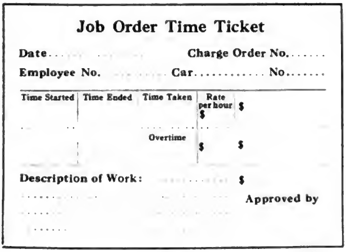
MAKE OF CAR.................... JOB NO. ....
DATE.................... CAR NO. ....

REPAIRS

CHARGE TO

SIGNED....................

Fig. 2



Job Order Time Ticket

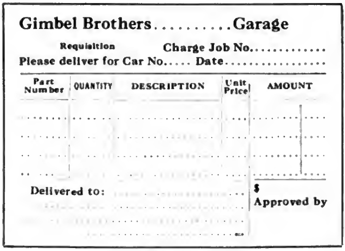
Date............ **Charge Order No.**.......
Employee No............. **Car**............ **No.**.......

Time Started	Time Ended	Time Taken	Rate per hour $	$
		Overtime	$	$

Description of Work: .... $

Approved by

Fig. 3



Gimbel Brothers..........Garage

Requisition **Charge Job No.**............
Please deliver for Car No...... **Date**................

Part Number	QUANTITY	DESCRIPTION	Unit Price	AMOUNT

Delivered to: .... $

Approved by

Fig. 4

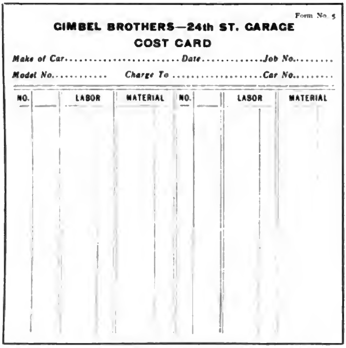
one and the same time. That is to say, every operation in connection with the working of the delivery system should be separately itemized, so that a thorough examination can be made at any time into some definite and single branch of the system. The cost sheet, or group of cost sheets, should form a complete analysis of the cost of operating and maintaining a delivery service. But, in addition, the cost sheet should show a synthesis of cost, that is to say, there should be one final part of the system that will show exactly the total amount expended, so that a man may say, "Well, that delivery system has cost me this year so many dollars. How does it compare with the cost last year when I was using horses?"

2. The cost sheet should be *clear* and *concise*. These two qualities rank in importance immediately after accuracy. The cost sheet is kept to guide one through the intricacies of transportation problems, and a guide belies its name if it is not clear.

Cost Sheet Should Be Simple and Concise

3. The cost sheet should be *as simple as possible*, and the forms used should not be over-ruled, and laden with unnecessary columns. The construction of a cost sheet should follow the primitive laws of construction, that is to say, the beginning should be made at the beginning and the end should be at the end. This may sound rather an absurd statement, but how often one finds, in the case of cost sheets, the beginning in the middle and the end at the beginning! The reading of a cost sheet should be as simple as stepping from one stone to another when crossing a brook. Each stepping-stone should be both individual and apart, performing two functions at the same time, forming a momentary standing and a momentary passage.

4. Percentage calculations and comparative figures and remarks should not enter into the cost sheet, save as appended notes in a final statement. *A cost sheet is a record of things that have happened,* while percentages are always comparative estimates.



Form No. 5

GIMBEL BROTHERS—24th ST. GARAGE
COST CARD

Make of Car........................*Date*.............*Job No.*........
Model No............ *Charge To* ....*Car No.*........

NO.		LABOR	MATERIAL	NO.		LABOR	MATERIAL

Fig. 5

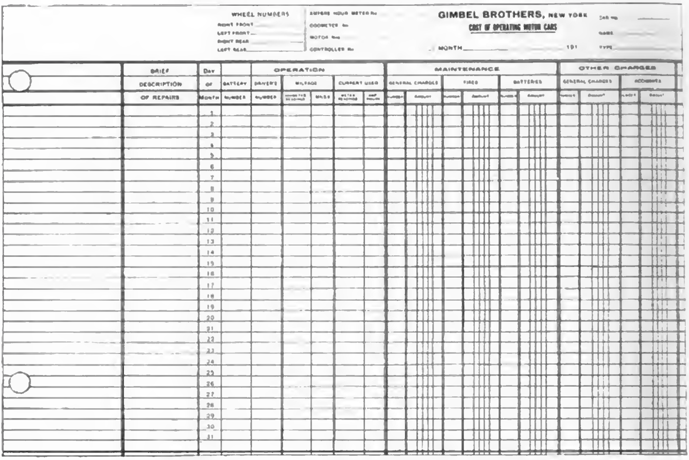
5. The filling in of the separate sections of the cost sheet should be regular and detailed to special operatives. *This work should not overlap but should fit in.* Sections nearly related can be under the control of an overseer, but outside these sections his control should cease, ending so as to *fit in* with the work of his successor.

The System Is the Starting Point

6. A definite system of costing should be settled upon and arranged before taking actual figures. The figures without the system are bewildering, and *the system is the starting point.*

These few points are worth remembering, but, as mentioned above, there can be no one and perfect system that will meet the requirements of every business. A department store will have a different kind of cost sheet from the owner of a laundry; the jeweler's cost sheet will differ from that of the tobacconist; the brewer will employ one kind of form, the baker another, and so on. The system at the back of the cost sheet depends on the service, as does the cost of working the vehicles, but behind every cost sheet there are a few definite fundamental rules. Some of these have already been outlined and the rest can be gathered from the perusal of forms that are now actually being used by all kinds of businesses. The dairy produce man may find several useful hints in the cost sheet of the motor bus operator; the butcher should study the cost sheet of the draper. This is so, because the problem of transportation is radically the same everywhere, although differing greatly in make-up and specific constituents.

It is proposed to publish in THE COMMERCIAL VEHICLE reproductions of cost forms that are being used in all kinds of businesses, from the huge department store to the small retailer with only one wagon. This month we are reproducing the complete cost forms used by Gimbel Brothers, the large department store, and those used by the Commissioner of Public Works, New York City. The Gimbel cost-keeping system is as follows:



WHEEL NUMBERS
RIGHT FRONT
LEFT FRONT
RIGHT REAR
LEFT REAR

AMPERE HOUR METER No.
ODOMETER No.
MOTOR No.
CONTROLLER No.

GIMBEL BROTHERS, NEW YORK
COST OF OPERATING MOTOR CARS
MONTH 191

CAR No.
MAKE
TYPE

BRIEF DESCRIPTION OF REPAIRS	DAY OF MONTH	BATTERY NUMBER	DRIVER'S NUMBER	MILEAGE		CURRENT USED		MAINTENANCE: GENERAL CHARGES		TIRES		BATTERIES		OTHER CHARGES: GENERAL CHARGES		ACCIDENTS	
					MILES	METER READING			AMOUNT		AMOUNT		AMOUNT		AMOUNT		AMOUNT
	1																
	2																
	3																
	4																
	5																
	6																
	7																
	8																
	9																
	10																
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	29																
	30																
	31																

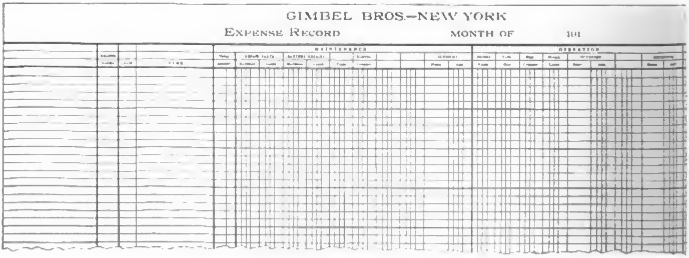
Fig. 6

1. *Defect Card.*—When a vehicle arrives at the garage, the driver reports on a Defect Card, Fig. 1, anything that has come to his attention during the day in connection with the car. All defects or other troubles have to be reported and the date and time filled in. There is room on the card for making ten entries. This card is handed in at the office by the driver, who states on the card his name and the number of the car. The card is signed by the receiver.

2. *Repair Ticket.*—The foreman examines these Defect Cards and if there are any repairs to be made he fills out a Repair Ticket, Fig. 2, and enters the work in the Job Order Book. The Repair Ticket is attached to the car to which it refers, and the repair number corresponds with the number entered into the book. The return of this tag to the office shows that the job has been completed. As can be seen, this form is exceedingly simple, and there is no unnecessary ruling.

3. *Job Order Time Ticket.*—The time that is spent by the mechanics in making the repair is noted on this ticket, Fig. 3, and these are turned into the office every day. The employee's number is entered on the card, together with time the work was started, and the time it was ended, with the total time spent on the job. The rate per hour at which the mechanic is paid is noted, and the total cost for the day in connection with the repair. At the bottom a description of the work being done is appended. The cards show exactly how each employee in the repair department has been employed throughout the day. This ticket must be signed by the foreman of the department.

4. *Requisition Ticket.*—All stock used for a job in the



GIMBEL BROS.—NEW YORK
EXPENSE RECORD MONTH OF 191

MAINTENANCE
OPERATION

Fig. 7

repair department must be requisitioned from the stock room on a Requisition Ticket, Fig. 4, on which the number of the job, the number of the car, and the date are entered, together with number of the part requisitioned, quantity required, and full description. Columns are left for unit price and total cost of parts ordered, and these are filled out by the man in the stock room, and turned in to the office at the end of each day. This form is also signed by the foreman.

Car Sheet Presents Final Statement

5. *Cost Card.*—All Time Tickets, Fig. 3, and Requisition Forms, Fig. 4, are assembled, and the total costs found on these are entered on a Cost Card, Fig. 5, on which the numbers of the job and car are stated. Space is left on this card for the statement of labor cost and material cost and these two are entered in separate columns. This Cost Card is finally completed when the Repair Ticket, Fig. 2, is returned to the office, showing that the job has been finished.

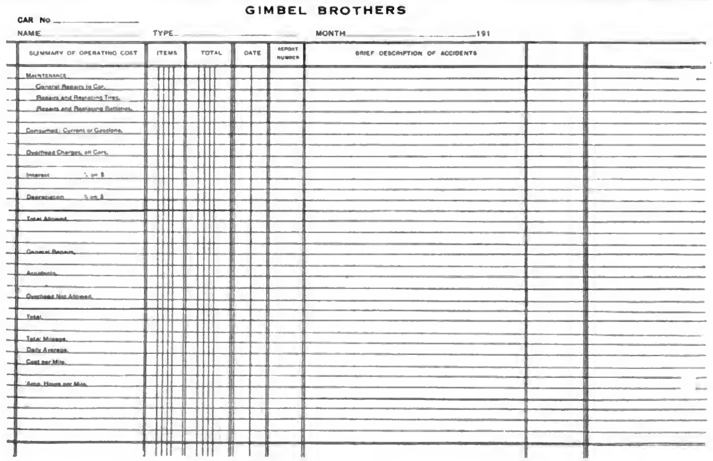
These five operations trace the progress of a repair to any machine in the service of the company, and it can be seen how accurately the cost of each operation is figured. Each card is quite separate, containing a definite amount of information, but they each provide data for the filling out of Cost Card, Fig. 5, which in turn, while complete in itself, provides figures for the next sheet.

6. *Car Sheet.*—The totals of the Cost Cards, Fig. 5, are entered in the appropriate columns of a Car Sheet, Fig. 6, which shows in detail the cost of operating and maintaining each vehicle every day of the month. One sheet is devoted to each car, and the number of the car is entered thereon, together with date and month, and the numbers of the wheels, ampere hour meter, odometer, motor and controller. The sheet is divided broadly into three parts, dealing with: (1) Operation; (2) maintenance, and (3) other charges. The battery number and the driver's number are entered, in columns with spaces for each day, together with the odometer readings, the number of miles traveled, meter readings and the number of ampere hours consumed. Under "maintenance," general charges, tire and battery cost are entered while "other charges" include cost of accidents, etc. At the end of every month this form is digested into a monthly statement, and entered on the back of the sheet, Fig. 6a. From this the complete cost of operation and maintenance of each vehicle can be obtained each month. The general repairs, tire repairs and battery repairs from Cost Card, Fig. 5, are listed, together with cost of gasoline or current, and the necessary allowances for interest and depreciation.

7. *Expense Sheet.*—To collect the expenses of a certain group or make of cars an Expense Sheet, Fig. 7, is used and the totals of this sheet must coincide with the summed totals of the expenses relative to all the cars composing that group. As in the preceding form, the maintenance and operating charges are grouped separately so that there may be no confusion in tracing the basis of an expenditure. This form is self-explanatory.

8. *Invoice Record Sheet.*—In addition to the Expense and Car Sheets, an Invoice Record Sheet is kept, and this is used for a record of all invoices for material purchased. This is kept each month, and proves invaluable in checking up stock on hand. Certain costs, allowed for in the guarantee of the maker of the vehicle in question, are grouped together. This record is in reality a complete statement of every cost incidental to the garage, including the wages of chauffeurs and helpers, rents, taxes, licenses, insurance, etc.

The cost system outlined above can be applied to practically any business where a large fleet of motor vehicles is being used. If only gasoline or only electric vehicles are being used then the system will be a trifle simpler. But the fundamental principles of cost systems are here demonstrated in an admirable manner. Each form or sheet is separate, yet each leads to the final form. The final form, in this case, may be taken as the monthly statement; Fig. 6a. Fig. 7 and the Invoice Record Sheet are more in the nature of amplifications of the monthly statement.



GIMBEL BROTHERS

CAR No ____________

NAME ____________ TYPE ____________ MONTH ____________ 191

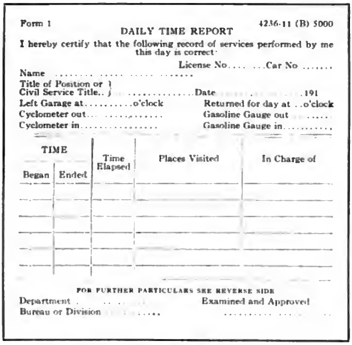
SUMMARY OF OPERATING COST	ITEMS	TOTAL	DATE	REPORT NUMBER	BRIEF DESCRIPTION OF ACCIDENTS		
Maintenance							
General Repairs to Car							
Repairs and Replacing Tires							
Repairs and Replacing Batteries							
Consumed: Current or Gasolene							
Overhead Charges, all Cars							
Interest % on $							
Depreciation % on $							
Total Allowed							
General Repairs							
Accidents							
Overhead Not Allowed							
Total							
Total Mileage							
Daily Average							
Cost per Mile							
Amp. Hours per Mile							

Fig. 6a

A Simple System for Keeping Costs

Used By a Department of Public Works

EXTREME simplicity and great efficiency are prominent characteristics of the system by which a complete record is kept of the cost of operating and maintaining the six pleasure cars and the commercial vehicle in use by the Department of Public Works, New York City. Primarily, only two tabular forms compose this system, which could easily be adopted by a business man with a small number of motor trucks in service. For the business man, however, this method in its present form would mean next to nothing, as it would show him only the cost of the vehicles themselves, and not the cost per ton mile, which is all important in the delivery service. One other point is to be considered in the adoption of this system for a self-propelled vehicle installation, and that is the garaging of the trucks. If the trucks are stored in a public garage, no changes in the system would be necessary, as that is the condition under which it operates at present, but, if the cars are housed in a private garage, the addition of a tabular form for keeping an itemized account of the repairs and other operations in the garage would be essential. Under the public garage system, the monthly invoices can be checked against the cost of the vehicles, but with the private garage something must be substituted for these invoices, and one tabular form, filled out each day, would no doubt suffice.



Form 1 4236-11 (B) 5000

DAILY TIME REPORT

I hereby certify that the following record of services performed by me this day is correct·

License No.... ...Car No ....

Name ....

Title of Position or Civil Service Title.. ....Date 191

Left Garage at..........o'clock Returned for day at ..o'clock

Cyclometer out... .... Gasoline Gauge out ......

Cyclometer in................ Gasoline Gauge in..........

TIME		Time Elapsed	Places Visited	In Charge of
Began	Ended			

FOR FURTHER PARTICULARS SEE REVERSE SIDE

Department .... Examined and Approved

Bureau or Division ....

Report Card Turned In Daily by the Driver

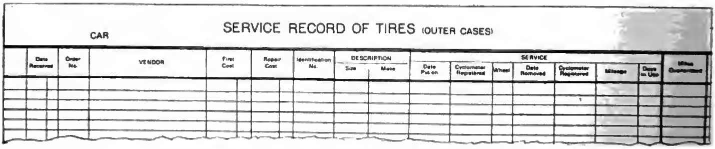
In municipal service there are peculiarities which will be found perhaps in no other kind of business. The pleasure cars operated by the Department of Public Works are used on inspection trips, as pay wagons, and for transporting officers between various points of the city. Of these vehicles one is a Peerless seven-passenger touring car, one a Pope-Hartford five-passenger touring car, two are five-passenger Buick vehicles, two are three-passenger Buick runabouts, and the motor truck is a 1,000-pound capacity Buick vehicle. The truck is used to carry supplies, etc., to public buildings, and has more than paid for itself three times over by the work it has done, according to the secretary to the commissioner of the department.

Much Idle Time at Present

With the system, or rather lack of system, in vogue at the present time, there is a great deal of idle time in the operation of the pleasure vehicles. Each department of the bureau is assigned one or more of the pleasure cars, according to its needs, for a certain space of time each day. When the cars report for duty in the morning it sometimes happens that the department to which one is assigned has no use for it at that time, or its work for that department may be finished before the time arrives at which it begins its duties for the next department, and in this way a great deal of time is lost during the day. The commissioner's secretary, however, who has charge of the motor vehicles, believes that this problem can be solved by the adoption of a system whereby the cars will remain at the garage until called for, no time being assigned to a department for the use or abuse, for idle time constitutes abuse, of the vehicle.

On this page will be found a reproduction of the tabular form filled out and signed by each driver each day and turned in to the office each morning, where it is passed upon and approved and forwarded to the bookkeeping department. The side of this report that is shown in the reproduction needs no explanation. It covers all of the items contingent upon the operation of the vehicles. On the reverse side is a space for the number of gallons of gasoline and one for the number of gallons of oil purchased during the day, with the price per gallon and the name of the person or garage from which the supplies were purchased. Two lines are devoted to the details, the remainder of the blank being left open for detailed notes on repairs, tire changes and miscellaneous remarks concerning the day's work of the car.

Several changes could be made in the driver's report card in adapting it to a motor truck installation. Not all of the items would be necessary when the card is used by a commercial vehicle driver; it is easy, however, to weed these out. Anyone who wished to adapt this system or a similar system

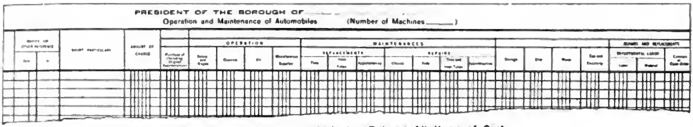


CAR

SERVICE RECORD OF TIRES (OUTER CASES)

	Date Received	Order No.	VENDOR	First Cost	Repair Cost	Identification No.	DESCRIPTION		SERVICE							Miles Guaranteed
							Size	Make	Date Put on	Cyclometer Registered	Wheel	Date Removed	Cyclometer Registered	Mileage	Days in Use	

Complete Record Is Kept on This Sheet by the Bookkeeping Department



PRESIDENT OF THE BOROUGH OF

Operation and Maintenance of Automobiles (Number of Machines ______)

Bookkeeper's Sheet on Which Are Entered All Items of Cost

to his business would have to make allowances for the peculiarities of his business and it is impossible to generalize to any degree on the changes that would be necessary.

The only other tabular form used in the cost-keeping system is the monthly expense statement, which is shown on page 26. Keeping a record of the expenses in such a detailed manner involves a great deal of labor and would be of no practical value in any other kind of business, where the cost per mile and the cost per ton mile are the most important factors. Carrying the cost forward on the same sheet from the time of purchase as shown here is a very good practice, however, and once under way would cause very little trouble. It is the finding of the cost per mile of each item that would require unnecessary time. A moment's close study will perhaps be required before the form is thoroughly understood, but when its composition is analyzed it is shown to be very simple. The upper part of the sheet is divided into five parts, each part dealing with some important phase of the whole system. First comes the identification of the car, under its name, which is printed on the sheet, being typewritten, its license number, the title of the person to whom it is assigned and the date of its purchase. Below comes item number two, covering the original investment and other parts and accessories since purchased. Item number three covers the maintenance cost to date. The next division is unnecessary or would be in a motor delivery cost record blank, as the average cost per month with which it deals is of no real value in the transportation of merchandise. As these reports are made out monthly, the detailed monthly expenses for the last month of which a record is taken, which is shown under the fifth heading, is of great importance. It permits of the carrying forward, from month to month, the items of expense and operation and serves in conjunction with the data given in the preceding columns as a complete record of all the expenditures to date with the last month in detail.

Arrangement of the Cost Sheet

The lower part of the sheet is devoted to such items as the total mileage, the number of days in service, etc. The single column under each heading in the upper part of the sheet becomes double in the lower, the left-hand column dealing with all the data to date, that is, to the first of the new month. In the column at the right are figures similarly arranged for the month just past.

This sheet is perforated for loose-leaf binding. In size this sheet is 17 by 15 inches, and is arranged for carrying the cost figures of ten vehicles. In the upper part of the sheet each space is 1 inch in width, the double column at the bottom dividing this width in half. The sheets are typewritten, the totals being printed in red. At the right side of the sheet one column is allowed for the grand totals.

A tabular form, similar to this, but used for the recording of the cost of commercial vehicles in a strictly businesslike way, would be somewhat different in its arrangement. Item number four could be left out, the average mileage per gallon of gasoline and oil are not essential, although of some value in determining the best grades of oil, etc., and the cost per mile for tires, repairs and gasoline, etc., are not of great importance. The merchant can, if he desires, insert the items of rent, insurance and depreciation. On this sheet a space is allowed for depreciation and storage takes the place of rent. In delivery service of certain kinds it is necessary to make an allowance for frequent painting of the bodies of the vehicles and another item can be inserted to cover that. Uniforms for the driver and his helper would come under the heading of miscellaneous supplies.

MOTOR VEHICLE RECORD

191 ,

8:00 A.M. to 5:30 P.M. Daily, Except Sunday and Sat. Half-Holiday

	Car	Driver	Miles	Time Run	HOURS IDLE ON TIME	
					Assigned	Unassigned
President..........						
Comr. of Public Works..						
As. Com. of Public W'ks						
Bureau of Highways. .						
Bur. of Hghwys. Main..						
Bureau of Sewers......						
Bureau of Sewers......						
Bureau of Sewers						
Bureau of Sewers......						
P. B. and O...........						
P. B. and O						
P. B. and O., Supplies..						
Payroll						
Payroll...............						
Bureau of Des. and Sur..						
Bureau of Des. and Sur..						
Secretary						

The Idle-Time Record Is Kept on This Sheet

Much better than keeping the cost per mile is the cost per ton mile, as judging a motor truck by its cost per mile is like judging men by appearances—it is not the show that the truck puts up, it is the work it accomplishes that counts. A 2-ton truck will of course cost much more per mile than a 1,000-pound delivery wagon, and if the business man compares these vehicles on this basis he is making a big mistake. On the other hand, if he compares the cost per ton mile he will be very much surprised. The comparison of a 2-ton truck with a 1,000-pound delivery vehicle is for purposes of illustration only, as no true comparison can be made between them, as they are intended for different purposes.

Assuming that each car averages one less than its full capacity of passengers, the cost of each vehicle would be, figuring on approximate weight of both cars and loads, respectively, 14 cents, 13 cents, 13 cents, 13 cents, 24 cents, 23 cents and 22 cents per ton mile.

In addition to the two tabular forms already described, three others are shown. Two are for the bookkeeping department. One is for a record of the tires used and the service they give and is of value in that it shows what kind of tires are giving the best service and therefore are the most economical to buy. The other is a sheet taken from the bookkeeper's ledger and shows how he enters in his books the cost of the operation and maintenance of the motor-propelled vehicles. Neither of these last two forms is necessary in a cost-keeping system under ordinary conditions.

The third sheet is kept by the secretary of the commissioner for his own record. It is a daily report, giving the mileage, the number of hours of running time and the number of hours idle on assigned and unassigned time.

Figuring the Ton Mile Cost

These figures are, perhaps, rather high, but it must be remembered that all but one of these vehicles are pleasure cars, and consequently the ton mile cost is high. In figuring ton mile cost it is necessary to include the weight of the vehicle and the weight of the load carried, as increasing the weight of the load carried or decreasing the weight of the vehicle will decrease the cost per ton mile. Otherwise, the manufacturer of a light truck with a capacity of 2 tons would obtain no credit over a manufacturer whose 2-ton capacity vehicle weighs more. The elimination of weight in a commercial vehicle is not of the same importance as the elimination of that quantity in the pleasure car, as the truck must have a certain amount of weight in order to stand up under its duties. A light vehicle is, however, a distinct advantage in certain lines of business.

Further comment on the figures showing the cost of the vehicles used by the Department of Public Works is perhaps unnecessary, as they show for themselves what these cars are costing. A comparison of these figures with others, or employing them as a criterion, would be a great mistake, as they do not give any idea of the cost of a pleasure car or a motor truck under different conditions. Judging from the figures, the 1-ton truck has not been kept as busy as it might have been under other conditions.

PRESIDENT OF THE BOROUGH OF MANHATTAN

Office of the Commissioner of Public Works

Statement of Cost and Maintenance of Motor Vehicles as at October 31st, 1912

								TOTAL
1. Identification of Car								
Make								
License No	3,964	3,963	3,965	3,966	3,967	3,968	3,969	
Assigned to	President	C. of P. W.	B. of Hwys.	B. of Hwys	B. of Hwys.	B. Sewers	B P.B.O.	
Date of Purchase	Apr 30, '10	May 5, '10	May 4, '10	Apr 22, '10	Apr. 22, '10	Apr 23, '10	May 27, '10	
2. Investment								
Original outlay for car and appurtenances	4,605.00	3,150.00	1,745.00	1,745.00	1,006.00	1,006.00	1,317.50	14,574.50
Appurtenances subsequently purchased	143.69	151.91	97.39	114.79	78.67	74.37	77.49	738.31
	4,748.69	3,301.91	1,842.39	1,859.79	1,084.67	1,080.37	1,394.99	15,312.81
3. Expenses to date 30 (Months)								
Maintenance								
Replacements	1,229.34	1,373.08	1,030.84	894.72	499.63	597.40	641.56	6,266.57
Repairs	429.71	763.43	1,055.66	826.79	921.09	657.36	918.64	5,572.68
Depreciation								
Operation	4,726.41	3,818.12	3,705.94	3,771.16	3,673.88	3,661.72	3,767.69	27,124.92
Storage	825.00	797.50	825.00	789.76	526.00	544.00	524.00	4,831.26
Total expenses to date	7,210.46	6,752.13	6,617.44	6,282.43	5,620.60	5,460.48	5,851.89	43,795.43
4. Average expenses per month								
Maintenance								
Replacements	40.97	45.78	34.33	29.83	16.67	19.92	21.38	208.88
Repairs	14.33	25.45	35.18	27.56	30.70	21.91	30.62	185.71
Depreciation								
Operation	157.54	127.27	123.53	125.71	122.46	122.06	125.59	904.16
Storage	27.50	26.58	27.50	26.32	17.53	18.14	17.47	161.04
Total average monthly expenses	240.34	225.08	220.54	209.42	187.36	182.03	195.06	1,459.83
5. Expenses for month of Oct. 1912								
Maintenance								
Replacements								
Tires				63.50		19.20		82.70
Inner tubes				6.75				6.75
Appurtenances				1.25		.95		2.20
Repairs								
Chassis	15.77			.65	11.60		14.10	42.12
Body						97.03		97.03
Tires	4.00			1.00	2.00	1.50	1.00	9.50
Appurtenances				4.00				4.00
Depreciation								
Operation								
Chauffeur	125.00	100.00	100.00	100.00	100.00	100.00	112.50	737.50
Gasolene	17.60	24.40	12.40	18.00	9.00	12.80	12.40	106.60
Oil	4.02	1.92	1.22	3.85	2.19	2.19	7.00	22.39
Miscellaneous supplies	3.29	.75		2.42		1.55	.75	8.76
Storage	27.50	27.50	27.50	27.50	18.00	18.00	18.00	164.00
Total expenses for month	197.18	154.57	141.12	228.92	142.79	253.22	165.75	1,283.55

	To Date	This Mo.	To Date	This Mo.	To Date	This Mo.	To Date	This Mo.	To Date	This Mo.	To Date	This Mo.	To Date	This Mo.	To Date	This Mo.
Total mileage	21,356	657	23,986	973	29,263	1,289	23,764	860	22,801	740	24,061	998	15,936	384	161,167	5,901
Working days	664	26	656	26	654	26	649	25	625	22	677	26	631	16	4,556	[illegible]
Gallons gasolene used	4,058	88	3,518	122	3,076	62	2,979	90	2,247	45	2,238	64	2,217	62	20,333	[illegible]
Gallons oil used	231¼	5¾	137⅞	2¾	95⅞	1¾	118¼	5½	104⅞	3½	92⅞	3½	122	10	1,102½	[illegible]
Average mileage per:																
Working day	32	25	36	37	44	49	36	34	36	34	35	38	25	24	35	[illegible]
Gallons gasolene	5	7	7	8	9	20	8	9	10	16	10	15	7	6	7	[illegible]
Gallons oil	92	114	174	353	305	736	200	156	218	236	260	319	49	38	146	[illegible]
Cost per mile for:																
Tires	.0575		.0572		.0352		.0376	.0816	.0219		.0248	.0202	.0402		.0389	[illegible]
Repairs	.0201	.0300	.0118		.0360		.0347	.0065	.0404	.0183	.0273	.0987	.0576	.0393	.0345	[illegible]
Gasolene	.0380	.0267	.0292	.0250	.0209	.0096	.0242	.0209	.0196	.0121	.0185	.0128	.0276	.0323	.0250	[illegible]
Oil and supplies	.0107	.0111	.0059	.0027	.0044	.0009	.0081	.0072	.0090	.0029	.0081	.0037	.0199	.0201	.0088	[illegible]
Storage	.0386	.0418	.0332	.0282	.0282	.0213	.0332	.0319	.0230	.0243	.0226	.0180	.0329	.0468	.0290	[illegible]
Salaries and wages	.1726	.1902	.1240	.1028	.1012	.0775	.1262	.1163	.1324	.1351	.1255	.1002	.1888	.2930	.1345	[illegible]
Total	.3375	.2998	.2813	.1587	.2259	.1093	.2640	.2644	.2463	.1927	.2268	.2536	.3670	.4315	.2716	[illegible]

The Guarantee of the Manufacturer

THIS subject is one of several, vital to the motor truck industry, upon which THE COMMERCIAL VEHICLE *has gained the actual opinion of all the leading dealers and manufacturers throughout the United States. By this method, the reader of the magazine, and presumably the user of the motor truck, can become acquainted with the views of those whose position necessarily places them as heralds in the forefront of reform campaigns in the motor truck industry. The user and the maker have identical interests. By co-operation—which can only be brought about by the open expression of views—the needed reforms and standardization of methods of manufacture and use incident to a new industry can be accomplished. This series of articles should be read by user and maker.*

THE QUESTION

The question of the extent to which a manufacturer should guarantee the product of his factory is one which has often been debated, and there are still many who are dissatisfied with the guarantee now in force, although the majority is in favor of the same. The question which was sent to makers and dealers throughout the country, and the answers to which are indicative of great difference of opinion, was as follows:

What are your views on manufacturers' guarantees?

THE ANSWERS

44 *replies received.*
18 *consider present guarantee adequate.*
5 *favor liberal guarantees.*
3 *think present guarantees are ruinous.*
2 *state that service is the vital point.*
3 *are against guaranteeing special service.*
3 *favor uniformity of guarantee.*
3 *favor guarantee of 90 days.*

THERE is a great difference of opinion with regard to the subject of manufacturers' guarantees, judging from the forty-four replies which THE COMMERCIAL VEHICLE has received to the above question. The majority of the dealers and manufacturers, however, consider the present guarantee adequate if it is backed up by the manufacturer, as it is simply a question of his living up to his moral obligations and by so doing keeping up a good market for his product. Otherwise the guarantee does not amount to the value of the paper on which it is written. There are eighteen out of the forty-four who hold this opinion and there are three who maintain that the present guarantees are ruinous. Liberal guarantees are favored by five, while two state that service is the vital point. There are three against the guaranteeing of special service and one who believes that the exceptional service guarantee will be eliminated before long. One maker is for a strong guarantee and another simply states that it is a necessary factor in making sales. Uniformity of guarantee receives three favorable votes.

There are three who are in favor of a guarantee lasting 90 days, one of these thinking that a central organization to limit the time a guarantee should hold would be a good thing. It is considered by one manufacturer that 6 months is long enough for a guarantee to hold, seven agree that a year is the proper length of time, and one guarantees his vehicles against all manufacturer's defects for 7 years. That the present guarantees are wholly inadequate and responsible for a great deal of trouble is the opinion of one dealer.

Opinions of Makers and Dealers

The following opinions have been expressed:

BOSTON, MASS.—The purchasing public are demanding more and more from the manufacturer each time a truck is sold—asking for ruinous guarantees, and it will be a question of who can survive the demands made upon the seller of trucks within a short time if the present guarantees are to continue. Six months is long enough to guarantee any truck, although our company guarantees its truck for a year. The guarantee is very much abused and at the present time we must take care of the individual.—H. B. Pruden.—Kissel-Kar Co.—KisselKar

NEW YORK CITY.—The guarantee does not amount to much on any truck. It is purely a question of the desire of the manufacturer to live up to his moral obligations, and if the manufacturers would work along these lines they would get a better class of customers and have greater satisfaction everywhere. We give but a 90-day guarantee on our trucks, excepting the worm and wormwheel, which is guaranteed for a year, as this feature is severely criticised by all the other American truck manufacturers.

We have been able to get orders here in New York from people who have had all kinds of propositions submitted to them in the way of guarantees. Such as "the truck would cost but so much per mile," and "that another truck would be instantly available to take its place should it be unable to operate for any reason," and bonds were to be given to cover this guarantee. When we obtained these orders, the guarantee was finally entirely eliminated. We are able to convince our customers that our method proves more satisfactory.—Robert C. Reid.—Hanolds Motor Car Co.—Pierce-Arrow.

Guarantees Must Be Clearly Expressed

PITTSBURGH, PA.—Manufacturers' guarantees are all very well if they express clearly what is covered by the guarantee. Being worth only as much as the manufacturer, we have found it is only the irresponsible who are willing to guarantee more than that covered by the A. L. A. M. warranty.—H. Howard.—Packard Motor Co. of Pittsburgh.—Packard.

CAMBRIDGE, MASS.—Would say manufacturers' guarantees are wholly inadequate and are responsible for a great deal of trouble. Business men will not stand for any such guarantee on a business proposition. You can get away with it on pleasure cars, but not on trucks. The agent has to make the guarantee to fit the conditions.—A. H. Harrington.—Dodge Motor Vehicle Co.—Commer and Pope-Hartford.

Depend on the Manufacturer

ST. LOUIS, MO.—Manufacturers' guarantees mean nothing except that the manufacturer will do as he pleases. Hence they depend on the manufacturer's desire to keep the old customer, and his ability to do so.—S. S. Aull.—Benoist & Aull.—Commer.

Cincinnati, O.—We believe the average manufacturer's guarantee very fair and just, and if lived up to should not occasion any complaint.—M. A. Enders.—Ford Motor Co.—Ford.

Cleveland, O.—Our opinion of manufacturers' guarantees is that they are practically worthless. A car user, who must lay up his car while he ships back a defective part awaits the manufacturer's judgment and delays his delivery until the manufacturer ships him a new part, gets no benefit at all from such guarantee. Also, while all the discretion in the matter is left with the manufacturer, the user is guaranteed nothing. The manufacturer may just as well cut out the A. L. A. M. guarantee as far as the purchaser is concerned.—W. C. Molin.—Grabowsky Power Wagon Co.—Grabowsky.

Philadelphia, Pa.—The manufacturer's guarantee is undoubtedly made in good faith, and we think the most important feature of the truck sale is to incorporate as liberal a guarantee as possible, and moreover, that even if the guarantee has expired and the customer comes in good faith and asks for the replacement of a part which he considers has not given sufficient service, they should be willing to meet him.—Fred. G. Browning.—Continental Motor Car Co.—Speedwell.

Chicago, Ill.—Will state that the usual guarantees of the manufacturers at the present time are for 1 year as to workmanship and being satisfactory.—R. S. Mattoon.—R. S. Mattoon Motor Car Co.—Indiana.

Cleveland, O—We are selling our cars entirely on the standard manufacturers' warranty, covering defects in workmanship and material. We are making no maintenance guarantees of any kind, as we believe they tend to cause dissatisfaction between the customer and the manufacturer in any adjustments which might arise. There is always the tendency on the customer's part to use his car less carefully if such a guarantee exists. There is a tendency on the manufacturer's part to believe the car has been abused whether it has been or not. We attempt to maintain a very liberal policy in the way of adjustments, to preserve and augment the reputation for fair dealing which we enjoy.—J. E. Bartell.—Baker Vehicle Co.—Baker.

Manufacturers Must Stand by Product

Milwaukee, Wis.—We should think all the manufacturers would stand by the truck more than they are doing, as the truck proposition is still in its infancy and it will take time and money to bring it out.—A. E. Raffant.—American Auto Co.—Pierce-Arrow.

Pittsburgh, Pa.—The manufacturer's guarantee depends entirely, in our judgment, upon the spirit in which it is interpreted, as in the majority of cases they are drawn by attorneys with a view of leaving every loophole possible for the manufacturer to shoulder his obligations, under the guarantee, upon the dealer or purchaser, if he so wishes.—Julian B. Howe.—Pittsburgh Auto Co.—Commercial.

Chicago, Ill.—Manufacturers' guarantees should be most liberal in the commercial car business. Manufacturers should list their parts' prices absolutely as low as possible to insure to the truck user low cost of upkeep, which will mean re-orders, more profits and continued good business. It is only necessary to make a profit on a part in the sale of it to the consumer of about 20 or 25 per cent., and this profit would care for the guarantee if proper materials were put in the truck in its first construction. This is all the manufacturer should ask, we believe, in commercial cars, since the health of the business depends entirely upon service and low cost of maintenance.—M. H. Luce.—Velie Motor Truck Co.—Velie.

New York City.—We consider the guarantee approved by the Motor Truck Club about two years ago as the only one which it is good business for manufacturers to give.—John H. Kennard.—Couple-Gear Co. of New York.—Couple Gear.

Minneapolis, Minn.—I think a manufacturer should have a uniform guarantee which should be reasonable in covering defective material, workmanship and defective principles in construction, but not guaranteeing specified service under all conditions or agreeing to overhaul cars in a year's time. Do not see any reason why the truck business should be handled any differently from any other legitimate business and do not think that the average merchant expects it or would expect it if not put up to him by some over zealous salesman.—A. E. Thompson.—McArthur-Tollars & Thompson Co.—Veerac.

Chicago, Ill.—We believe most thoroughly in liberal manufacturers' guarantees within reasonable limits; that is to say, workmanship and material should be positively guaranteed and the manufacturers should be liberal in passing upon claims made under the guarantee.—A. W. Zimmerman.—Mercury Mfg. Co.—Mercury.

The Guarantee Is Necessary

Philadelphia, Pa.—It is necessary for the manufacturers of a commercial car to guarantee their product. The guarantee should be so worded that it may easily be understood both by the salesmen and the prospective purchaser; and the salesmen should use great diligence in fully explaining to the customers exactly what the guarantee covers, and the manufacturer must stand right up to the letter of his guarantee.—P. Prouty, Autocar Service Co.—Autocar.

Chicago, Ill.—We think it will be necessary to restrict the guarantee entirely to the replacement of absolutely defective material. We do not think, as the trucks are driven and overloaded at present, that a guarantee on any other basis can be satisfactorily maintained.—Francis L. Thomas.—Franklin Automobile Co.—Franklin.

Chicago, Ill.—The manufacturer's guarantee is an excellent institution where the letter of the guarantee is adhered to, and it is a great benefit to the sales end of the business.—L. B. Garrison.—Speedwell Motor Car Co.—Speedwell.

San Francisco, Cal.—Manufacturers' guarantees seem very satisfactory as they are at present. Every manufacturer is obliged to stand back of his goods, and while the printed form of guarantee is effective and binding, the moral guarantee which makes every manufacturer say, "I must take care of my goods if they are to remain in the market" is, after all, the guiding thought.—H. F. Marsh.—Standard Motor Co.—Stoddard-Dayton.

San Francisco, Cal.—The manufacturers' guarantee is not worth the paper it is written on. The manufacturers have all kinds of excuses to make when there is something wrong. Most of the time it is the manufacturer's fault, due to the use of poor material and not knowing the building and construction of vehicles. The writer guarantees his goods and does the best he can to help his customers out. We do not give a man a truck when he breaks his machine down; he has to wait until it is fixed. The trucks are being made better right along; the trouble in 1912 has been only half as much as it was in 1910.—Paul Kleiber.—Kleiber & Co.—Gramm.

Guarantees for One Year Only

New York City.—We guarantee our truck for a year. We do not believe in any guarantee longer than for a year.—L. A. Van Patten.—American Locomotive Co.—Alco.

Chicago, Ill.—The manufacturers' guarantees, I believe, are as liberal as is consistent under present conditions. I believe service to the owner of commercial cars is of much more vital importance than the factory guarantee. Our service department is operated on a plan which enables us to as nearly as possible give the customers uninterrupted delivery service. When a customer notifies us that he is in trouble a mechanic is immediately dispatched to him, and in the event the trouble is of such magnitude that the car will be out of service for a length of time that would interfere with customer's deliveries, we send one of our service wagons to make his deliveries and continue to do so until the customer's car is repaired and ready for service. Of course a nominal charge is made for the service where the trouble is not due to faulty construction in the car.—F. W. Arbogast.—Studebaker Corp.—Studebaker.

MINNEAPOLIS, MINN.—In regard to manufacturers' guarantees will say that a truck that is guaranteed for 1 year against all defective parts ought to be broad enough to satisfy the most critical buyer.—J. M. Oston.—Avery Co.—Avery.

ST. LOUIS, MO.—Uniformity in guarantee is desirable and the principle underlying the proposition is such that this should not be difficult. We believe that it is a bad business to put out guarantees of such character that continual argument is bound to result. The guarantee should be such that purchasers are fully protected up to a reasonable point, but we believe it is better to reduce the initial cost rather than to provide for probable adjustments under the guarantee in fixing this figure.—C. E. Michel.—Union Elec. Lt. & Power Co.—General Vehicle.

NEW YORK CITY.—Our 17 years' experience with the reliability and assuring certainty of Aries construction, together with the remarkable results obtained by owners, enable us to guarantee the Aries trucks for 7 years against all manufacturers' defects. We are strongly in favor of long manufacturers' guarantees.—J. Jaccard.—J. Jaccard & Co.—Aries.

CHICAGO, ILL.—In reference to the guarantee, will state that we are operating under the guarantee of the N. A. A. M., and up to date have been able to run our business in accordance therewith.—F. E. Parker.—Packard Motor Car Co.—Packard.

The Manufacturers' Guarantee Is Ample

PHILADELPHIA, PA.—I believe that the manufacturers' guarantee is ample to cover all of the proposition. We have outgrown the infant stage of the truck business where it was necessary to guarantee the purchaser of the truck that it would do everything that he required and a number of things that he never would require. I do believe that it behooves every purchaser of a truck to purchase that truck from a firm in his own city which is in a position to give him service on his trucks and which carries a line of parts of that truck that can be immediately replaced upon the breaking of any part. In our own establishment our service department is never closed; after we sell a truck we are always here to give service to the purchaser.—W. H. Metcalf.—Woods Electric Garage.—Mais, Walker, Waverley, Detroit and Dayton.

NEW YORK CITY.—In regard to manufacturers' guarantees, we believe that it will not be very long before these guarantees will be eliminated. Any reputable manufacturer will naturally stand back of his truck to the extent that if there is anything radically wrong in the material or construction, he will make it good.

The service guarantee, however, is something that does not exist in other lines of business, and will be eliminated in a very short time we believe from the truck industry.

There is no reason why the manufacturere who sells a truck and delivers it to a business organization should maintain that truck or be responsible for any abuse that the truck may be subjected to. The people who sell steam engines, boilers, elevators, typewriters, or any other kind of machinery would not be expected to do it, and there is no reason why truck manufacturers should.—M. R. Machol.—Hydraulic Truck Sales Co.—La France.

MILWAUKEE, WIS.—Our view of the manufacturers' guarantee should be the limiting of replacements, etc., to 90 days. The present methods of manufacturers vary all the way from 60 days to 7 years. Unless some central organization can effect enough public united action on a specified time for all, it will never be changed. We would strongly urge your taking it up on this basis.

As to overloading, we guarantee our cars only for 25 per cent. overload. The idea of an overload is merely to allow sufficient variation in judgment when loading merchandise on a truck. The 25 per cent. will prevent the unfair buyer from buying a 3-ton car for 4-ton service. Both of these items are the most serious to the truck industry from the manufacturers' standpoint and are the first subjects that ought to be tackled.—J. C. Milchmann.—Stegeman Motor Car Co.—Stegeman.

Guarantee Should Be Extremely Liberal

PHILADELPHIA, PA.—The manufacturers' guarantee should be extremely liberal, and in fact must be, to allow agents to handle the commercial end to advantage; a branch house though is far superior to an agency. They will pay only when operated on a large scale. Service is the all-important factor. All cars should be followed up with a course of inspection and repairs made frequently enough to never allow a tie-up of longer than one night. All repairs should be made at night or at such time as would not inconvenience the merchant.

It has been our experience that when possible to keep a truck on the road continually, it is possible to keep a satisfied owner.—E. C. Johnson.—E. C. Johnson Co.—Reo.

MINNEAPOLIS, MINN.—Manufacturers' guarantees are no good in their present state.—A. C. Showers.—Chase Motor Truck Sales Co.—Chase.

CHICAGO, ILL.—We think the present manufacturers' guartee is all right.—G. P. Foraker.—Foraker Dayton Motor Truck Co.—Dayton.

CINCINNATI, O.—We believe a guarantee of 1 year against defective workmanship and material for cars is sufficient to cover any automobile as it would be impossible for any manufacturer to place a better guarantee and live up to it. Nothing in the world is used as hard as an automobile, and we do not believe that any guarantee could be more easily taken advantage of by the different users, especially so if different forms of guarantee were placed upon them.—H. V. Ilg.—Schacht Motor Car Co.—Schacht.

CINCINNATI, O.—As to manufacturers' guarantees, it appears to us that the truck factories can as well afford to guarantee their trucks as a manufacturer of machinery guarantees his product. We would look with suspicion on any truck that was guaranteed against defects of workmanship or material for only 90 days. The better factories are certainly guaranteeing for a year, and some even go better and guarantee against those defects for the life of the machine. Of course no one would attempt to guarantee against wear and tear or accidents.—J. A. Du Brul.—Miller, Du Brul & Peters Mfg. Co.—Avery.

Adhering to One Year's Guarantee

CHICAGO, ILL.—Our views concerning guarantees are somewhat different from competitive manufacturers, and we are adhering strictly to a year's guarantee against anything but misuse and abuse as well as overloading.—W. W. Bishop.—Chicago Pneumatic Tool Co.—Little Giant.

CHICAGO, ILL.—Regarding the manufacturers' guarantees, we believe this has been very well covered by the manufacturers and undoubtedly should be limited to 90 days, as the majority of purchasers are bound to misconstrue these guarantees, and anything longer than 90 days would add considerable confusion.—F. N. Stewart.—Buick Motor Co.—Buick.

PHILADELPHIA, PA.—The manufacturers' guarantee is a very necessary factor in the sale of trucks.—N. W. Buzby.—Merchants Motor Service Corp.—Dayton.

NEW YORK CITY.—Would say that we guarantee our trucks 1 year. I find most of the expense pertaining to same is not due to structural weakness, but to the lack of experience and care in the operation of same. This is a very vital question to the truck dealers as it eats into the profit if you take care of them without charge, and owing to the fact that the public is not educated it is very unreasonable about paying for same if charged for, and attributes everything to the fault of the truck, and thinks that it should be practically maintained even to the question of tires for a period covered by the guarantee.—F. F. Lewis.—Knickerbocker Motor Truck Co.—Knickerbocker.

MINNEAPOLIS, MINN.—The stronger guarantee the manufacturer puts on the trucks the better it is from the salesman's point of view.—P. H. Downes Co.—Gramm.

NEW YORK CITY.—We believe the guarantee should be a thoroughly equitable one which will do justice to both the buyer and the seller. It should not be ambiguous in terms, but should clearly state exactly the responsibilities upon the shoulders of both manufacturer and the user.—R. T. Alcutt.—Knox Automobile Co.—Knox.

Maker Must Live Up to Guarantee

PHILADELPHIA, PA.—There is no question but that the manufacturer must give certain guarantees and live up to them, and I believe that the only operation figures which should be given to the customer are those which the manufacturer will guarantee.—W. W. White.—General Vehicle Co.—General Vehicle.

PHILADELPHIA, PA.—We believe any guarantee not based on actual experience is given for the purpose of selling and is, therefore, unbusinesslike. Generally speaking, we believe only in a straight guarantee against defective material and workmanship, backed by a conscientious factory. Along this line, we feel that the sooner manufacturers stop their salesmen from talking guarantees, the better it will be for the whole trade, as there are few instances where a good business house has purchased cars solely because of guarantees. They generally buy the car which in their opinion will be most satisfactory in their service, but know that they can receive unusual guarantees from certain manufacturers and use this as a club to obtain similar guarantees from companies who prefer to do business on a more businesslike basis and who outside of all guarantees when they sell a car consider it an obligation which is not permanently and finally discharged until the car has proved absolutely satisfactory. E. S. Hare.—Commercial Truck Co.—Commercial.

MEDFORD, MASS.—To guarantee only against mechanical defects for 1 year and live up to it.—P. J. T.—Teel Mfg. Co.—Teel-Woodworth.

The Zenith Carbureter

AN interesting little booklet has been issued by the Zenith Carbureter Co., Detroit, Mich., descriptive of the operation of the carbureter. It is stated that the carbureter will operate from the lowest to the highest speed on various grades of fuel, is not affected by altitude and needs no adjustment. It has no springs to weaken, no valves to bind, get dirty or stick or hammer their seats out of shape, no pistons to get loose, and consequently the carburetion is permanent for the life of the motor. The throttle is not connected to any moving part to correct the defect of a single nozzle, thereby avoiding excess of gasoline when climbing a hill or going through mud or sand with open throttle and reduced speed.

The construction of the compound spray nozzle is such that the motor receives a constant mixture at all speeds.

General Progress o

Reports from Makers wit
Sales from Octobe

THE political atmosphere did not cause any considera
outlook for the winter and for the spring still contin
show an optimis

THE general tendencies in the motor truck industry during the past month have been good and excellent prospects are forecast. The general position of the industry can be seen from the following reports from many of the leading manufacturers:

Truck business from October 15 to November 15 with the PACKARD MOTOR CAR CO., Detroit, Mich., has been very brisk. There have been several orders received from different companies for large numbers of trucks. The American Express Co. heads the list with an order for sixteen trucks. For the past month the demand has been the strongest in the express and hauling businesses. Although a larger number of 3-ton trucks has been sold than 2-ton trucks, the demand for the 2-ton size has been beyond expectations.

One of the most interesting features of the period from October 15 to November 15, as far as the AMERICAN LOCOMOTIVE CO., New York City, is concerned, was the sale of four Alco trucks to the Government. Two of these were specified for service in the Philippine Islands. They will be used for salvage work in the fire department there. The other two, one of 2 tons capacity equipped with a coal dump body, will be employed at the army post at West Point. All four of these trucks will have a severe test, the roads in the Philippines being in a primitive state, and those about West Point very hilly. An interesting phase in this connection is that the government authorities did not adopt their usual custom of requiring specially built trucks, but used standard machines. In the opinion of the company the outlook was never so bright in the motor truck industry. The general prosperity that has swept the country naturally means that more motor trucks are required to move the large crops and manufactured products.

Velie Reports Big Market for 1-ton Trucks

The VELIE MOTOR VEHICLE CO., Moline, Ill., reports that the demand in this firm's territory at the present time is heaviest with the packing houses and furniture trade, and the principal demand is for 2 and 3-ton trucks. The company considers that there is a big market for 1-ton trucks and is accordingly going to have one in the market very soon.

The ADAMS BROTHERS CO., Findlay, O., reports that sales have been small in size, but pretty generally distributed. The capacities of trucks sold are 1 ton and 1½ tons. The demand during the period from October 15 to November 15 was especially noticeable in the east and southern states. No particular lines of business are noticeable as to buying trucks, sales being well scattered. From the present outlook, business looks very good for the winter months, and from business already booked the company has enough work to keep the factory busy until March 1.

The BUICK MOTOR CO., Flint, Mich., says that the Buick truck game has never opened up as it is expected it will in the next 12 months. The company is to have a new line of commercial vehicles on exhibition at both the New York and Chicago shows.

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to November 15

rruption of business in the motor truck industry. The
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of the future.

The **United States Motor Truck** Co., Cincinnati, O., finds that there is a largely increased number of inquiries for motor-driven trucks, but cannot say that this demand is springing up from any particular line of business; it seems to be general. While there was a slowing up of business incident to the end of the year, and possibly also affected by the election, the trade in general is manifesting greater interest than ever before, and the company looks for a record business during the spring months. Some sales recently made include two trucks with bus bodies to hotels, the Potter House, at Santa Barbara, Cal., and the Natick House, at Los Angeles, Cal., for carrying guests between the depots and the hotels. This has brought quite a number of inquiries from owners of other hotels and from realty companies, who are exploiting building lots, for carrying their customers from the city to their subdivisions. At the present time the firm is building exclusively 2 and 3-ton trucks and finds a heavier demand for the 3-ton than for the 2-ton trucks. It seems the general tendency is for heavy trucks.

Orders for Dayton Trucks Increased Considerably

Orders have increased considerably in the past month with the **Dayton Auto Truck** Co., Dayton, O., especially orders for 3 and 5-ton trucks. The demand is greatest in the east, but Chicago and the middle west follow very closely. Chicago is especially wide awake to the possibilities of motor trucks and is ordering them in large quantities for both present and spring delivery. Contractors, furniture houses, moving businesses, coal dealers and lumber concerns are the largest buyers. However, the trucks sold during the past month or more have gone into varied lines of service as they are no longer looked upon as being practical for just one line of service.

Kissel Company Experiences a Surprise

The month from October 15 to November 15 was a great surprise to the **Kissel Motor Car** Co., Hartford, Wis. While it long ago became apparent that business conditions would not be seriously affected by the election, it nevertheless was thought impossible that trade would show any abnormal activity during the days nearest November 5. But the last week in October proved to be a perfect "hummer." Prospects in hand for some time were closed in widely separated parts of the country and the demand kept up consistently during the early days of November. For some time a noticeable activity in the demand for KisselKar trucks has been among the fruit growers of the Pacific Coast. One agent in a remote California locality has just ordered three 4-ton trucks and writes that he has twenty prospects in his immediate vicinity. The largest percentage of sales from October 15 to November 15 was made in the west and northwest, although other parts of the country, particularly Illinois and New England, stood well in the race for honors. Fifty per cent. of the trucks sold were of 1-ton capacity, 10 per cent 1,500 pounds, 10 per cent. 2 tons, 20 per cent. 3 tons and 10 per cent. of these were of 4 and 5 tons capacity.

The **Mais Motor Truck** Co., Indianapolis, Ind., informs us that its representatives are continually receiving re-orders for trucks from owners. As an example, the Loux Co., of Philadelphia, large wholesale furniture dealers, have had a number of trucks in continual operation and recently placed an order for two more 2½-ton trucks through the Bartlett garage, of Philadelphia. It is found that the demand comes principally from the larger cities, through New York, Boston, Philadelphia, Chicago and surrounding territories. The company is making a specialty of 1½, 2 and 2½-ton trucks and finds that the demand is largest for the heavier truck of 2½-ton capacity. Trucks have been sold for at least forty different kinds of trade. At the present time the greater demand seems to be coming from furniture and hardware dealers, lumber companies, contractors and transfer companies. A gradual increase in inquiries from these trades is noticed, as well as from a number of other trades where trucks can be used to good advantage; the demand for trucks is bound to increase at least 50 per cent. over that of last year. The tendency is for heavy-duty trucks built of the very best material and along engineering principles, and the customer absolutely requires that the company from whom he buys a truck will guarantee the service and assist him in the maintenance of his vehicles.

Orders placed during the past month by the **Couple-Gear Freight-Wheel** Co., Grand Rapids, Mich., have been fully up to expectations, and to a considerable extent in excess of the output of the company. The demand is heaviest in the east, the capacity sold in almost all cases being 5 tons or greater, and the majority of them sold during the past month have been for use in the coal and lumber fields. The tendency of the trade is to purchase the heavier moving machines and the firm's principle of carrying the majority of the pay-load upon the large wheels with the steel tire seems to be generally liked.

Anderson Co. Reports on the Electric Field

The **Anderson Electric Car** Co., Detroit, Mich., reports many inquiries from people preparing for next spring's business, and among them are many calling for the purchase of twenty-five to seventy-five cars. In one instance, they are wanting the ½-ton size and another wants the 1-ton and 1½-ton cars; another wants sixty-five assorted sizes, and another ten of the 3½-ton size. The heaviest demand has been with department stores, owing to the company's specializing more on the light-size vehicles. An excellent trade in furniture delivery has been experienced, owing to specializing on a special wheelbase and special body. Sales have been about equal between the ½-ton and the 1½-ton, the light car leading slightly. During the past month the central stations have taken most of the cars. Outside of that, sales have been fairly well divided between the general run of delivery service, no one part of the business predominating. The general feeling seems to be in favor of the electric vehicle in cities of larger population. This conclusion is from the quantity of inquiries received from a number of dealers asking for lines, and the number of salesmen who have been in other lines of motor vehicle work that have made application for positions, the general reason being they have bumped up against electric vehicles in sales work and have had some very hard questions to answer and compete with.

The **Knox Automobile** Co., Springfield, Mass., states that the heaviest demand at present in the commercial line continues to be in the Knox Martin tractor and in fire vehicles. The tractor particularly is meeting with an extensive sale for large capacities of 6 tons and over. The lines of business in which the trucks are being sold vary considerably. There seems to be no tendency for any one field to predominate over any other.

Contractor Uses Trucks

The Motor Truck Is the Most Economical Solution of the Contractor's Hauling Problem

THE truck of high capacity seems to be specially adapted for use in contracting work, where the supplies to be carried are almost invariably of a bulky nature. Steam shovels, concrete mixing machines, traveling hoists, cable ways and other mechanical devices are all largely used in contracting work, and the hauling of such apparatus is a big job. The up-to-date contractor has come to recognize that it is impossible for him to keep in line with his competitors unless he uses such machinery, and he is now beginning to see that in addition he must take into his service a motor truck of high capacity so that this costly apparatus may be hauled with the greatest possible convenience and with the least possible chance of damage. But by far the more important use he finds for the motor truck is the delivery of raw material to keep such machinery in constant use. The motor truck does not differ from other machinery; all machinery must be kept working if an owner wishes to reap profit therefrom.

On large contracts the matter of haulage is undoubtedly of supreme importance. Work has to be done in a certain specified time and the contractor must keep strictly to schedule. Necessary material must be at hand at all times, and there must be no accumulation of excavated material.

Advantages of Motor Vehicles for this Work

The motor truck is the most economical solution to the contractor's hauling problem because it can be worked for 24 hours without rest. Horse haulage for contractors is a costly business, for the work being heavy the animals need plenty of rest. Another big advantage of the motor truck is that no provision has to be made for feeding a large number of horses at both ends, and in addition the number of motor trucks required to do the same amount of work will be considerably smaller and will not take nearly so great an amount of room when left standing. Records show that horses used in this kind of work retain their efficiency for not more than 2 years, whereas a suitably constructed motor truck may be safely relied upon for many more. As a practical illustration of the use of a motor truck in contracting work, the following facts and figures are of great interest.

The Bridgeport Hydraulic Co. has purchased two Locomobile 5-ton trucks for use in connection with the construction of a storage dam at Easton, Conn. They are used in hauling heavy supplies, such as cement, coal and machinery, from Bridgeport to the site of the dam, a distance of 7 miles, on particularly bad roads, with many soft stretches where the mud is almost ankle-deep. There are eight or ten steep hills and the dam is situated at the top of the last. There could have been no better testing ground for the two Locomobile trucks, owing to these very hard conditions.

Two Locomobile 5-Ton Trucks Used by the Bridgeport Hydraulic Co. for Contracting Work at Easton, Conn.

Mileage of 7,509 in 6 Months

During the 6 months from the time when these trucks first supplanted the horse-drawn equipment to the latter part of September, each truck had run up a mileage of about 7,500 miles.

At first the schedule called for four trips a day each, which far excelled the best results obtainable from the horse-driven wagons, but now five trips per day are made, 5 tons being the standard load.

Before purchasing these trucks, the Bridgeport Hydraulic Co., in an effort to obtain absolute figures as to the horse transportation, had some coal delivered in a horse-drawn wagon. On the day of the test it was found that this four-horse team was able to make two trips with a 4-ton load, but it was realized that this was a record which it would be unable to duplicate if the horses were kept on the service every day.

A Train Load of Hackney Motor Plows, Now Being Largely Used in Western Canada, Arriving at Winnipeg

Cost Per Ton Mile Only Ten Cents

Using these figures as a basis of comparison in order to avoid any danger of making the cost per ton mile with the horse-drawn vehicle too high, and charging $3.50 per day per team of horses and $2 a day for the driver, a very low charge, the cost of transporting two 4-ton loads 7 miles, a total of 56 ton miles, would be $.1607 per ton mile. With the trucks making four trips a day, carrying a 5-ton load, a total of 140 ton miles and allowing $15 a day to cover all charges on the truck, the cost per ton mile was only $.1071.

On the basis of five trips per day to the dam, carrying a load of 5 tons, the trucks shows a total of 175 ton miles. Allowing $18 for all truck charges the cost per ton mile is only $.1029 which, as compared to $.1607 per ton mile for the horse-driven team would seem to indicate in no uncertain terms the economy of the large capacity motor truck.

Although the item does not appear on the books and consequently cannot be credited in any way, the use of the trucks has saved the Bridgeport Hydraulic Co. a good many dollars through avoiding the necessity of cutting down a hill, a proposition which was seriously considered while the horse equipment was being used for this heavy hauling work.

An official of the company in charge of the construction work recently said, "I have been actively engaged in the construction of several reservoirs and kindred work for our company, but as I look back and think of what I considered were excellent facilities for handling raw material and supplies, I often wonder how we ever got along without the motor truck. It may surprise you when I state that our motor trucks are actually taking the place of 25 two-horse teams."

Trucks Not So Destructive to Roads

Continuing, this official said, "I find that the trucks are not as destructive to the roads as were the large number of horse-drawn wagons with the narrow tread steel tires, formerly on the work; also that by carrying three or four times as much on one load as could be carried in the horse-drawn vehicle, general traffic was greatly reduced, with the result that delays due to turning out for other vehicles were fewer and the roads thus kept much clearer. I find, too, that we do not have the congestion in loading or unloading as was often the case when horses were used."

This opinion is very interesting as it brings out one of the most important points with regard to motor traction in general, namely, its effect on lessening the pressure of traffic in congested places, especially in large towns. The congestion of traffic is nearly always due to horse-pace methods, and with the elimination of these by the motor truck, far better conditions will exist.

G. M. C. Vehicle Used by the Municipal Authorities of Detroit as a Dog-Catching and Carrying Wagon

Motor Plows Popular in Western Canada

THE Hackney motor plow is proving very popular in Western Canada with the smaller farmers who are farming on quarter or half sections. A feature of the machine that makes it of special interest is the fact that the plows can be removed and replaced with road-grading equipment, a most valuable arrangement where the greater part of the work on the municipal roads is done by the farmer.

The plows, three 14-inch bottoms, are carried on a special subframe under the body of the machine and are raised and lowered by means of a special clutch operated by the motor. Automatic lift is provided on the plow in case of a rock being struck. This allows the plow to clear the obstacle without interfering with the work of the remaining plows.

The machine can also be used for any other farm work requiring mechanical power.

The accompanying illustration shows a trainload of Hackney motor plows arriving at Winnipeg recently for farmers in that district.

Dog-Carrying Vehicles

Pittsburg and Detroit Are Both Using Motor Vehicles for Animal Rescue Work

DAY by day one sees how universally the motor truck is on the ascendant. In fact, this seems now a truism, but one scarcely hoped to find the commercial vehicle employed as a dog carrier, at least until almost the last horses had been relieved of hauling work.

The Animal Rescue League, Pittsburg, Pa., has just secured a motor wagon for the purpose of catching and carrying dogs.

The truck used is a model B Lange, of 2-ton capacity, manufactured by the Lange Motor Truck Co., Pittsburg. The vehicle, which is illustrated herewith, is divided into 34 compartments, for the purpose of preventing fighting among the dogs, and also for the prevention of the communication of disease. The floors are lined with aluminum and each compartment is equipped with a self-locking gate. The body is easily removed from the chassis and can be cleaned without trouble. An electric buzzer, operated by a push button from the rear step, signals to the driver to stop when a stray dog or cat is sighted.

It is declared by the league that in the course of the wagon's work many stray dogs are picked up and that the new motor truck affords protection for these animals.

Detroit Also Has a Dog-Carrying Vehicle

Detroit is also adopting the motor truck for such purposes. The latest addition to that city's fleet of municipal commercial vehicles is a G. M. C. dog-catcher's wagon, illustrated herewith. The vehicle is operated under the direction of the police department and is doing splendid work, capturing about 90 muzzleless dogs per day. The wagon is designed to carry the animals in the most humane way. Fourteen cages of various sizes are fitted in the machine, and separate compartments can be arranged for the vicious kinds. Each cage is equipped with a water pan and is easily removable. The body is very handsomely painted in a shade of green and has lettering in gold leaf, altogether making a very striking and attractive piece of work.

This use of a motor truck adds still further emphasis to the facts stated in our leading article and also in that appearing on page 42, relative to the great strides which the municipal authorities are making in the adoption of the motor truck for all branches of municipal work.

Two-Ton Lange Truck in the Service of the Pittsburg Municipal Department Used for Dog Carrying

Activities in the Motor Truck World

General Motors' President Resigns—United States Motor Co.'s and Dayton Co.'s Affairs—Proposed Good Roads Exhibit—Truck Exhibitors at the Forthcoming Shows—Trades Represented at National Motor Shows

PRESIDENT OF GENERAL MOTORS CO. RESIGNS

THOMAS NEAL, hitherto president of the General Motors Co., has resigned from that position, becoming instead chairman of the board of directors. The manager of the Buick, C. W. Nash, succeeds Mr. Neal. The latter's resignation is in accordance with the arrangement made when he accepted the position, namely, that he should be permitted to retire as soon as the business had been established on a sound financial basis. The most recent report issued by the company shows that this is now the case.

J. N. Wallace, formerly a director of the General Motors Co., has retired, his place being taken by C. W. Nash. The directorate consists of the following: Joseph Boyer, Anthony N. Brady, Emery W. Clark, W. C. Durant, Andrew H. Green, Jr., J. H. McClement, Edwin D. Metcalf, M. J. Murphy, C. W. Nash, Thomas Neal, James J. Storrow, Albert Strauss, Nicholas L. Tilney and Jacob Wertheim. Thomas Neal retains his position as head of the finance committee.

UNITED STATES MOTOR CO.'S AFFAIRS

On January 8 the United States Motor Co., by order of the United States District Court, will be sold. Formal bids for any of the six divisions into which the assets have been divided may be submitted if accompanied by an earnest of good faith. The plan of reorganization which was summarized last month has been generally accepted by the creditors.

It is reported that the plan for merging the Flanders Motor Co., Detroit, with the United States Motor Co. is progressing favorably, and there seems to be a definite and clear understanding between the two parties, although no contract has been signed. An official announcement relative to the matter is expected shortly.

RECEIVER FOR DAYTON AUTO TRUCK CO.

The Dayton Auto Truck Co., Dayton, O., is in the hands of a receiver, this resulting from a suit brought against the company by T. J. Wheatley and other stockholders in order to wind up the affairs of the business. It should be understood that the action is quite a friendly one and that the business is being continued until the property can be disposed of.

GOOD ROADS EXHIBIT AT PANAMA EXPOSITION

W. G. Scott, corresponding secretary of the Inyo County Good Roads Club, proposes an elaborate highway exhibit

Truck Exhibitors at Forthcoming Motor Vehicle Shows

Chicago Show, February 10 to 15—Truck Exhibitors

Adams Bros. Co.
American Locomotive Co.
Autocar Co.
Buffalo Electric Vehicle Co.
Buick Motor Co.
Clark Delivery Car Co.
Dayton Auto Truck Co.
Federal Motor Truck Co.
Flint Motor Wagon Dept., Durant Dort Carriage Co.
Garford Co.
General Motors Truck Co.
Gramm Motor Truck Co.
Hupp Motor Car Co.
International Motor Co.
Thos. B. Jeffery Co.
Kelly Motor Truck Co.
Kissel Motor Car Co.
Knox Automobile Co.
Krebs Commercial Car Co.
Locomobile Co. of America.
W. H. McIntyre Co.
Old Reliable Motor Truck Co. (formerly Henry Lee Power Co.).
Peerless Motor Car Co.
Pierce-Arrow Motor Car Co.
Pope Mfg. Co.
Reliance Motor Truck Co.
Reo Motor Car Co.
Selden Motor Vehicle Co.
Speedwell Motor Car Co.
Sternberg Mfg. Co.
Studebaker Corp.
United States Motor Truck
Velie Motor Vehicle Co.
Walker Vehicle Co.
Waverley Co.
Bowling Green Motor Car Co.
Chase Motor Truck Co.
Dart Mfg. Co.
Lippard Stewart Motor Car Co.
M. & P. Electric Vehicle Co.
Service Motor Car Co.
Standard Motor Truck Co.
Transit Motor Truck Co., Inc.
Universal Motor Truck Co.
Avery Co.
Baker Motor Vehicle Co.
Bessemer Motor Truck Co.
Brown Commercial Car Co.
Chicago Pneumatic Tool Co.
Commerce Motor Car Co.
Four-Wheel Drive Auto. Co.
General Vehicle Co.
Gramm-Bernstein Co.
Harwood Barley Mfg. Co.
International Harvester Co.
Lauth-Juergens Motor Car Co.
National Motor Truck Co.
Packard Motor Car Co.
D. F. Poyer & Co.
Sanford Motor Truck Co.
A. O. Smith Co.
White Co.

APPLICANTS ON WAITING LIST

Mogul Motor Truck Co., Chicago.
Mercury Mfg. Co., Chicago.
H. J. Koehler S. G. Co., New York
Ideal Auto. Co., Ft. Wayne, Ind.
Kentucky Wagon Mfg. Co., Louisville, Ky.
Ware Motor Vehicle Co., St. Paul, Minn.

Detroit Show, January 27 to February 1—Exhibitors

Winton Motor Co.
M. A. Young Automobile Co.
W. J. Marshall Auto Co.
Detroit Electric Co.
Chas. E. Miller Co.
Buick Motor Co.
Cadillac Motor Co.
Barber Motor Sales Co.
Automobile Equipment Co.
Carter Car Co.
Postal-Fair Motor Co.
P. W. Schulte & Sons.
Bemb-Robinson Co.
Oakland Motor Car Co.
Siegel-Zeckendorf Co.
Olds Motor Works.
Grant Bros. Auto Co.
Regal Motor Sales Co.
Sewell Cushion Wheel Co.
Studebaker Corporation.
Esco Auto Lock Sales Co.
Seidler Sales Co.

Minneapolis Show—Exhibitors

Bowman & Libby, Inc.—Overland.
Studebaker Bros. Co.—Studebaker.
Wilcox Motor Car Co.
Pence Auto Co.—Federal.
R. W. Munzer & Sons.—Hupmobile.
Grand Rapids Motor Truck Co.
Deere Webber Co.—Velie.
Columbus Buggy Co.—Kelly.
White Garage.
Avery Mfg. Co.
Chase Motor Truck Sales Co.
P. J. Downes & Co.—Gramm and Alco.
Waldref-Odell Motor Car Co.—Pierce-Arrow.
Northwestern Auto. Co.—K-R-I-T.
Joy Bros. Motor Car Co.—Packard
United Motor-Mpls Co. — [illegible] Sampson.
J. I. Case Threshing Machine Co.—Stephenson.
Theo. M. Anderson.—Peerless

Scranton Show—Exhibitors

Chas. B. Scott Co.—Stevens-Duryea, Oakland, White.
Conrad Bros. Co.—Ford, Standard Electric.
Economy Auto Co.—Locomobile.
Ralph A. Ammerman.—Buick, Modern.
Susquehanna Motor Car Co.—Cadillac.
V. A. Simrell.—Studebaker.
John H. Fleming.—Hudson, American.
Eureka Motor Car Co.—Franklin, Regal.
Lackawanna Auto Co.—Packard, Chalmers, Reo.
A. M. Baker, Jr.—Hupmobile.
P. J. Needham.—Maxwell.
Standard Motor Car Co.—Pierce-Arrow, Autocar.
Rambler Motor Car Co.—Rambler.
Anthracite Motor Car Co.—Overland, Chase.
A. J. Schnell.—Kline Kar, Abbott, Detroit.
M. R. Zendher.—Stanley Steamers.
Winton Co.—Winton.
M. A. Cadden.—Paige.
C. W. Cramer.—Jackson.
C. A. Ritzman.—Apperson.
C. C. Conrad.—Liberty Brush.
F. E. Hubbard—Stoddard Dayton, Michigan, Mercer.
Bishop Bros.—K-R-I-T.
Giles & Ely.—De Tamble.
Peter Beyrent.—Haynes.
Harry Smith.—Cole.
C. A. & L. M. Connell.—Alco.
Belles & Perry.—Little Car.

Table Showing Trades Represented at National Motor Truck Shows

	Chicago Show.		New York Show.		Both.	
Baking and Bakers' supplies		19		31		50
Barrels and boxes		15		15		30
Brewing and malting	72		72		144	
Wines and liquors	18		48		66	
Bar supplies	5		4		9	
		95		124		219
Building and contracting	81		188		269	
Building materials	28		45		73	
Brick, tile, stone, sand and gravel	31		44		75	
Roofing and roofing materials	11		19		30	
Sash, doors and blinds	19		16		35	
		170		312		482
Coal and wood		126		79		205
Cleaning (and dyeing, rugs, pneumatic)		17		12		29
Clocks and watches	12		5		17	
Silverware and jewelry	2		12		14	
		14		17		31
Cigars and tobacco		11		20		31
Confectionery	19		26		45	
Ice cream	5		4		9	
		24		30		54
Department stores	59		64		123	
Dry goods	27		58		85	
Clothing and underwear	38		130		168	
Boots, shoes and rubbers	14		35		49	
Hats, caps and gloves	7		19		26	
Men's furnishings	4		21		25	
Millinery, trimmings and notions	13		41		54	
		162		368		530
Drugs and chemicals, druggists' supplies		32		34		66
Electrical machinery and apparatus		27		30		57
Furniture, beds and bedding	93		89		182	
House furnishings	10		11		21	
Rugs and carpets	4		16		20	
		107		116		223
Florists and florists' supplies	10		18		28	
Seeds and nurserymen	8		9		17	
		18		27		45
Groceries and grocers' supplies	101		132		233	
Flour and milling	34		27		61	
Canning	6		6		12	
		141		165		306
Heating and ventilating	5		11		16	
Stoves and furnaces	16		10		26	
Steam fitting and fittings	4		4		8	
Plumbing and plumbers' supplies	26		50		76	
		51		75		126
Ice, cold storage and refrigerators		15		18		33
Importing and exporting		3		55		58
Iron, steel and other metals	50		82		132	
Structural steel	4		5		9	
Metal manufacturing	41		79		120	
Hardware	59		72		131	
		154		238		392
Leather, trunks, leather goods		20		36		56
Laundry and laundry supplies	14		20		34	
Soap	5		11		16	
		19		31		50
Light, heat and power companies		123		132		255
Lumber	127		136		263	
Lumbering	4		4		8	
Millwork	12		11		23	
		143		151		294
Machinery and belting	72		75		147	
Machinists and boilermaking	8		17		25	
Engines, elevators, fans and blowers	14		11		25	
Tools	13		13		26	
Foundries	24		29		53	
		131		145		276
Meats	26		38		64	
Meat packing and packers' supplies	32		10		42	
		58		48		106
Milk, dairies, butter and cheese		35		20		61
Mineral, spring and soda water and supplies		22		26		48
Office machines and supplies	13		11		24	
Blank books, stationery, periodicals	5		15		20	
Safes	1		..		1	
		19		26		45
Municipalities		86		69		155
Municipal officials		203		186		389
Paper, paper boxes, tags and labels		33		78		111
Paving and paving materials		14		11		25
Paints and varnishes	29		32		61	
Painting and decorating and supplies	14		10		24	
Oils and grease	21		23		44	
Wall paper	8		5		13	
		72		70		142
Pianos and musical instruments		14		35		49
Produce and commission		43		74		117
Printing and publishing, supplies	58		86		144	
Ink and type founding	5		1		6	
Engraving, electrotyping, lithographing	15		11		26	
		78		98		176
Railroad (steam) companies	49		26		75	
Railroad cars, equipment and supplies	22		15		37	
		71		41		112
Rubber goods		10		25		35
Storage and moving	61		56		117	
Expressing	42		54		96	
Teaming and delivery	49		58		107	
Livery	9		2		11	
Wagons, carriages and parts	19		14		33	
Hay, grain, feed, harness and shoes	20		23		43	
		200		207		407
Textiles and dyeing		9		134		143
Telephone service		13		1		14
Undertaking, caskets, cemeteries		12		27		39

at the Panama-California Exposition at San Diego, 1915. This will be the very first exhibit of this character to be given on any scale of magnitude.

It is proposed to divide it into two sections—an outdoor and indoor display. The first would show materials and appliances for the construction and maintenance of good roads—machinery, materials, full size working models of portable road building camps. Actual construction work would be demonstrated; cross sectional illustrations of highways either actual size or on a reduced scale showing the simplest construction best adapted to improvements of loam, sand, adobe and other varieties of ground; bridge, materials and drainage would all be comprehensively treated.

TRADES INTERESTED IN MOTOR TRUCKS

To what extent interest is taken in motor trucks and their use by different lines of business is a matter of no little interest and value. Probably the surest guide to this is the attendance at the big National commercial vehicle shows held annually in New York and Chicago.

A tabulation of all responses received to invitations to attend last winter's New York and Chicago shows has been made by the statistical department of the National Association of Automobile Manufacturers. Invitations were sent, in round numbers, to 40,000 companies located in the territory embraced by the New England, middle Atlantic and north central States as far south as Tennessee and as far west as Oklahoma. Most of these companies have a financial rating of $50,000 or more, indicating that they are easily capable of buying trucks or delivery wagons.

About 7,500 companies responded to the invitations, and these are included in the tabulation, making the most comprehensive investigation ever undertaken along this line.

Doubtless it will surprise many to learn that 155 city governments were represented by mayors and members of the council, fire and police commissioners and chiefs, street and park commissioners and other department head; also that 255 telephone and light, heat and power companies are listed, and 75 steam railroads.

That the trades which have been most dependent upon horses heretofore are deeply interested in the motor truck is shown by the fact that 407 teaming, storage and moving, expressing, delivery, wagon and carriage, hay, grain and feed and harness companies are listed. However, the building and contracting trades lead, with the metal, metal manufacturing and hardware trades well up toward the top of the list.

It should be borne in mind, however, that the number of companies represented in any particular trade is not necessarily an indication of the exact relative interest of that trade in commercial motor vehicles nor of its probable absorbing ability during the coming year. These are dependent upon the proportion borne by the number represented in the list to the total number of companies in each trade in the territory tributary to the shows and the average number of trucks operated by the truck-owning companies in that trade. For example, the probable demand for power vehicles by the 123 department stores would greatly exceed the demand by the 176 printing and publishing companies or the 117 storage and moving companies.

In the entire United States there are 4,700 department stores, of which 123, or about 1 in 38, are represented in the show list; there are 989 storage warehouses in the country, of which 78, or 1 in 12, responded to show invitations; and there are 26,500 printers and publishers, of whom 133, or 1 in 200, responded. But, whereas a storage warehouse or printing and publishing house of the largest size might buy half a dozen motor trucks, a department store would require nearly half a hundred.

Truck manufacturers and their sales and advertising managers will find the list issued by the N. A. A. M. a reliable guide to the trades to which it is most worth while to devote their selling efforts, while the publishers of general trade periodicals, for their part, will be able to note the relation of the motor truck to their respective fields and consider whether or not in their reading columns they are serving the interests of their readers sufficiently with respect to this modern method of transportation.

The tabulation is reproduced above, with the trades insignificantly represented omitted.

As originally compiled, the list showed 225 distinct lines of business, including manufacturers, jobbers, wholesalers, retailers, commission merchants and others in each line. These various trades have been rearranged into broad groups of allied lines for convenient reference. In order of the number of replies received, the trades most prominently represented are as follows:

Building and contracting trades	482
Metal and hardware trades	392
Grocery trades	306
Machinery and tool trades	276
Light, heat and power companies	255
Dry goods and clothing trades	253
Furniture, beds and bedding, carpets, rugs and house furnishing	223
Brewing and liquor trade	219
Expressing, teaming, etc.	214
Coal and wood	205
Printing, publishing and allied trades	176
City governments	155
Lumber trades	151
Textiles and dyeing	143
Paints, oil and decorating trades	142
Heating, plumbing and steamfitting trades	126
Department stores	123
Storage and moving	117
Produce and commission	117
Steam railroads and equipment	112
Paper and paper-box trades	111
Meat and packing trades	106
Boots, shoes, hats, gloves and men's furnishing	100

Manufacturers' Convention at Detroit

Meeting of the National Association of Automobile Manufacturers

A very successful meeting of the N. A. A. M. took place at Detroit, and a record of the work done in the past by the Association shows how closely it is connected with the well-being of the motor truck industry. Two resolutions passed at the meeting, with reference to demonstration charges and body weight allowance, have been adopted by the executive committee.

Several extremely interesting papers of vital importance to both manufacturers and users of motor trucks were read, and excerpts from the most significant of these, namely, those dealing with the question of guarantees, delays in loading and unloading at freight terminals and docks, and the problems in front of the truck salesman, respectively, are given below, together with tables.

DETROIT, Nov. 16.—The first mid-year convention of the National Association of Automobile Manufacturers was held at the Pontchartrain Hotel November 14 and 15. It is doubtful if the association ever held a more successful meeting, in the light of the large number of prominent manufacturers who were present, the fund of valuable knowledge which was imparted, the important business transacted and the results accomplished.

The convention was opened Wednesday, November 13, with a meeting in the afternoon of the executive committee of the association, composed of W. E. Metzger, president; S. D. Waldon, W. C. Leland, R. D. Chapin and Hugh Chalmers, Detroit; W. T. White and L. H. Kittridge, Cleveland; Alfred Reeves, New York; H. H. Rice, Indianapolis; G. W. Bennett, Toledo, and S. A. Miles, Chicago.

However, it was not until Thursday morning, when the general sessions commenced, that the greater number of the members arrived.

This day was taken up with the reading of various authoritative papers and discussions, while in the evening the Detroit members tendered to those from out of town and to other invited guests a most enjoyable banquet in the auditorium of the Pontchartrain. About 250 attended the affair, and many interesting speeches were made. At the speakers' table were Henry Ford, Hugh Chalmers, W. E. Metzger, H. B. Joy, Thomas Henderson, L. H. Kittridge, R. E. Olds, H. O. Smith, Hal Smith, James Keena, George T. Moody, L. W. Goodenough, J. C. Wetmore, E. B. Boyd, Nat Duke and J. N. Willys.

On Friday morning several more papers were presented, and in the afternoon an important conference between leading representatives of the railroads and the members brought the actual business of the convention to a close.

Outline of the Objects of the N. A. A. M.

The first speaker on the program at the opening session on Thursday morning was S. A. Miles, general manager of the National Association, who outlined its past work, its present objects and its future. He explained the reasons for holding the convention at this time when manufacturers are not busy with shows. Meetings held during the show season do not furnish the members a suitable opportunity to get together, to know each other and to ascertain what is going on in the association and in the world of automobiling, and to get out of the association the full benefit of the advantages it offers.

In his talk Mr. Miles considered the history of the association for the special benefit of the newer members. The association was organized November 10, 1900, at the first show held in New York. The first executive committee meeting was held on December 3, 1900, and the body was incorporated May 4, 1904. The industry was then a mere dot in the world of commerce. There were about a dozen manufacturers, a few experimenters and a few importers.

Mr. Miles traced the course of the National Association during the days when the Selden patent was in force. Although the association never had any connection with either the licensed or unlicensed faction and had in its ranks members of both sides, it was the victim of circumstances, and with the formation of the two rival bodies commonly called the licensed and the unlicensed associations it became a house divided within itself, though it did not fall. Since the reversal of the court decision and the abandonment of the licensed association the National Association has regained much of its former strength, although it is not yet, as it once was, the sole representative of the trade.

Another body, known as the Automobile Board of Trade, has been formed, and much of the work of the two organizations now existing is duplication. It is hoped that the two can be consolidated, as there is much sentiment in that direction at present.

"*No matter whether this can be accomplished or not,*" said Mr. Miles, "*the removal of the barrier between the two classes of members and the return of the National Association to power was the signal for results which plainly show the inevitable consequences of co-operation.*

Work of the Various Committees

"Our freight department, backed by the members and the influence of a united industry became a real power and its value increased tenfold. Our commercial vehicle committee became so active that its work is among the most important we have done. Our show committee jumped into the breach and headed off threatened opposition in New York. The membership committee has added nineteen members to the roll, so that we have now 105 upon the list, by far the greatest number in our history. *Our work became once more aggressive and creative. We have done more good in the last 18 months than in the 7 years preceding.*"

The general manager further reviewed the work of the traffic department, the co-operation with the Manufacturers' Contest Association, the adoption of standard warranties, truck standardization activities and show work. He closed by saying: "The association, like the trade it represents, is stronger, richer and better than ever before; hence we have reason to believe that we shall continue to be more useful with every new year of our existence."

The following is a report read by Mr. L. D. Waldon relative to the worth of the commercial vehicle committee since the June 4 convention:

Report of the Commercial Vehicle Committee

Efforts made to ascertain the extent to which the standard truck warranty recommended by the National Association has been adopted by manufacturers have elicited replies from sixty-four makers. Sixteen members and eighteen non-members of the association have reported their definite adoption of the warranty and their intention to incorporate it in their new catalogues when issued. Nine other member companies and one non-member are in favor of the standard warranty and report that when they are manufacturing commercial cars on a sufficiently large scale to require a truck warranty they will probably adopt this one. Seven non-members favor the warranty and say they will adopt it if a majority of the makers do so. Three members and one non-member report that they have the question under consideration. A list of these companies was published in a former issue of the COMMERCIAL VEHICLE.

Only nine companies have stated their opposition to the warranty. The Autocar Co. and General Motors Truck Co., members, and the Rockert Manufacturing Co., Driggs-Seabury Ordnance Corporation, National Motor Truck Co. and Wichita Falls Motor Co., non-members, object to the limitation of the warranty to 90 days instead of one year. The Ford Motor Co. and Franklin Manufacturing Co. are using their passenger car warranties. The Pierce-Arrow and Driggs-Seabury companies' warranties are practically the same as the standard warranty except that Pierce-Arrow gives a year's guarantee on its worm drive, and Driggs-Seabury a year on the entire truck.

Ten member companies which are making or have produced commercial cars have failed to respond to inquiries.

The Commercial Vehicle Committee has had a design made for lithographed copies of the warranty, to be made up into books like stock certificates, with end stubs on which records can be entered as the warranties are issued to truck purchasers. These warranties will be issued to members free of charge in lots of 500 or 1,000, with each company's name printed in the warranty. Non-members may also obtain the lithographed warranties at prices to cover the cost of printing and distributing—probably $10 for lots of 500 bound in three books, and $15 for lots of 1,000 bound in four books of 250 each. These warranties are about commercial letter size.

Sample caution plates, as recommended at the June 4 convention, have been made up, and circulars announcing them and giving the names of manufacturers and prices at which they can be obtained are in course of preparation. Unexpected delay has been caused, however, by a feeling that it was necessary to revise the scale of body weight allowances adopted at the March convention before putting the plates into use. As soon as this has been disposed of satisfactorily, it will permit the issuance of circulars describing fully the plates and how to stamp them.

Suggestions have been made that an open-air exhibition of trucks be held in the summer or fall of 1913, either as an experiment supplemental to the regular midwinter show or to take the place of the latter after this winter. It was argued that such a show would give opportunity for the display of vehicles at work and various quick-loading systems. A careful canvass was made of the sentiment of the members of the association on the subject, and, while there was considerable diversity of opinion and an evident disposition to look upon the outdoor display with favor, the predominant feeling appeared to be that there were more than enough shows already and that to introduce a big national exhibition between April and December would tend to prolong the show season throughout the year, with its attendant disorganization of the factory forces. For this reason, the committee returned a resolution to the executive committee opposing the open-air show idea.

As the result of an analysis of the scale of demonstration charges adopted at the June convention and an attempt to compare them with the cost of doing work with hired teams and trucks on a ton-mile basis, it has been found that the ton-mile rate based on the demonstration charges lacks uniformity and does not decrease logically as the size of the truck increases. In order to overcome this objection and the objections that the charges are too high for the larger sizes of trucks, considerable study has been given to this subject and a scale of demonstation charges based on actual operating costs has been prepared.

Tabulations Regarding Street Conditions

Much additional data bearing on these subjects have been gathered, analyzed and tabulated. The results are embodied in detailed reports that have been multigraphed for distribution. They show pretty conclusively that bad street conditions are costing truck users and tire companies very large sums of money by tire destruction alone. This prevents the motor truck from making as good a showing in economy as it is capable of making under proper conditions and thereby no doubt seriously retards the sale of trucks in certain cities—notably, in Baltimore, Pittsburgh and Cincinnati.

Painstaking comparison of the reports of commercial car production as gathered by the committee with similar reports compiled by other agencies confirms the calculation that there were, in round figures, from 28,000 to 30,000 such vehicles of all types, including converted cars, in use in the United States at the beginning of this year. These had an average value of about $2,070 and a total valuation of $58,000,000 to $62,000,000. The calculation includes the products of 250 companies, of which a number have gone out of business.

A comparison of registrations of motor trucks this year with similar registrations for the same period a year ago shows that the number of commercial vehicles coming into use is more than doubling annually.

Reports bearing on this subject and other reports showing the relation of the geographical distribution of commercial vehicles to good roads and population have been prepared and issued to the trade and to periodicals for publication.

Data bearing on the weights of American truck chassis have been obtained from manufacturers and tabulated for comparison with rated load capacities. These have been averaged and charts drawn showing uniform scales of chassis weights from one-half ton to ten tons carrying capacity. These have been issued together with tables and reports on the subject, from which it is possible for engineers to determine, when laying down the designs for a new truck, what the weight of the chassis should be to compare favorably with other trucks. No attempt has been made to standardize chassis weights and it is doubtful if it is desirable to do so. Copies of these reports are available to anyone who requests them.

Some investigation has been made along this line also, and averages determined and curves plotted showing a range of uniform powers for trucks of different capacities. No report has been issued as yet on this subject.

It is evident that by consulting the charts and tables showing the standard speed ratings, the average horsepower, standard body weight allowance and average chassis weight, it is possible for anyone to determine readily what should constitute a truck of any given load rating; that is, what power, weight and speed a truck of any rated capacity should have. Composite charts and tables can probably be prepared to enable these things to be ascertained at a glance. It may even be possible to work out a formula that will enable the engineer to determine any one of the factors when the others are known. This should result in a balanced machine on a par with others in the market.

It is opportune here to refer to the standard frame widths and lengths back of driver's seat which were adopted at the May 1 meeting of the National Association. Many new companies are being organized and new trucks designed all the time, and it is particularly desirable that the N. A. A. M. standards should be kept prominently before the designer in these early stages. With a view to rendering truck bodies more readily interchangeable between different makes of trucks of the same capacity rating, and enabling the body builder to make up stock bodies that can be mounted on any make of chassis on demand, with no more delay than will be occasioned by putting on finishing coats of paint and varnish, the committee collected a large quantity of data from truck manufacturers and from an analysis of these recommended two standard frame widths, namely: 36 and 42 inches, and frame lengths back of seat in multiples of half feet, from 48 inches for the lightest package delivery car to 216 inches, or 18 feet, for the largest sizes of trucks.

By making frames in multiples of foot and half-foot lengths, the number of frame lengths in common use on trucks of one, one and one-half, two, three and five-ton trucks can be reduced to fifteen sizes that would meet all ordinary requirements even with short, medium and long wheelbases in each capacity. These would be made in half-foot lengths from 8 to 15 feet. However, ten sizes from 9 to 14 feet will serve the more common requirements.

Recommended Frame Lengths and Widths

These can be made to fit the two widths of frames—36 and 42 inches—and to the styles most called for, such as open express, screen express, panel delivery, stake, grocery, furniture, brewery, and van. If a majority of truck makers will adopt the recommended frame widths and lengths it will enable the body builder to make up a limited number of stock styles and sizes during slack seasons and fit them to chassis promptly on demand after putting them through the paint shop.

A careful classification has been made of the 7,500 responses received to invitations issued to business houses to attend the National Commercial Car shows held in New York and Chicago last winter. The results have been tabulated and reports prepared showing the number of different trades represented, and the number of houses represented in each of the more important trades.

The purpose of this work is to furnish a reliable guide to truck makers, and their sales manager and advertising manager, of the relative value of the different trades as fields of endeavor for making sales, selecting advertising media, and so forth.

Two general meetings of commercial vehicle manufacturers have been conducted by the Commercial Vehicle Committee during the year, the minutes of which have been published and mailed to all members and to manufacturers of commercial cars who have not yet joined the association. A large amount of publicity has been given to these conventions and to the work of the association in the truck field by the motor car periodicals and the daily press.

This is an opportune time for the Commercial Vehicle Committee to extend its thanks to members of the association and to members of the trade who are not yet within the ranks, but have shown a disposition to co-operate with it, for the spirit of helpfulness that has been generally displayed and which has enabled the committee to do work that will be of value to the whole industry. Without such co-operation it will be difficult to get reliable information to serve as the basis for statistical work and the establishment of standards.

Two Resolutions Adopted by the Committee

Two resolutions passed at the meeting have been adopted by the executive committee.

The scale of demonstration charges for commercial vehicles has been lowered because it was considered desirable that charges to be made for demonstrations of motor trucks should bear a close relation to the actual normal cost of operation of the vehicles and that the rate per ton mile of work done should decrease as the capacity of the unit increases..

Theoretically, the cost per ton of motor trucking should decrease as the size of the truck increases, and, logically, any schedule of charges for demonstrating motor trucks should bear a definite relation to the actual cost of operation and maintenance. Such charges should also be so fixed that the cost of doing a given amount of work will be less with the power vehicle than with horses and wagons.

The most elaborate tables of truck operating costs are those issued by the Hewitt Motor Co. and the Knox Automobile Co. They agree closely in the average per diem costs of motor trucks from two to five tons capacity. These costs are shown in the appended table in columns 2 and 3, together

DAILY COST OF TRUCK OPERATION COMPARED WITH PROPOSED SCALE OF DEMONSTRATION CHARGES

1 Truck Capacity (tons)	2 Average Operating Cost Per Day (Hewitt)	3 Average Operating Cost Per Day (Knox)	4 Approximate Average Cost Per Day	5 NAAM Speed Rating (MPH)	6 Ton-Miles Per Day 5 Hours Running	7 Rate Per Ton-Mile (cents)	8 Scale of 125% of Operating Cost (per day) (new scale)	9 Rate Per Ton-Mile (cents)
½	....	....	....	16	40	....	$10.00	25.00
1	$8.58	....	$8.50	15	75	11.33	10.00	13.33
1½	9.50	....	9.50	14	105	9.04	11.50	10.95
2	10.53	$10.60	10.50	13	130	8.07	13.00	10.00
2½	11.48	....	11.50	12	150	7.66	14.00	9.33
3	....	12.20	12.25	11	165	7.42	15.00	9.09
3½	13.18	....	13.00	10½	183¾	7.07	16.00	8.70
4	....	13.80	14.00	10	200	7.00	17.00	8.50
4½	14.84	....	15.00	9½	213¾	7.01	18.00	8.30
5	....	15.00	15.50	9	225	6.88	19.00	8.40
6	....	....	16.50	8	240	6.87	20.50	8.54
7	17.23	....	17.25	7	245	7.04	22.00	8.97
8	....	....	17.75	6	240	7.39	23.00	9.58
9	....	....	18.25	5½	247½	7.33	24.00	9.69
10	18.50	....	18.50	5	250	7.40	25.00	10.00

with a schedule, in column 4, of uniform approximate average costs for all truck sizes. The costs are also plotted in a chart published by the Association.

The work done by each size of truck is shown in ton miles in column 6. The ton-mile capacity of a truck in a working day is assumed to be the tonnage rating of the vehicle (column 1) multiplied by its speed in miles per hour (column 5) times one-half the number of working hours, that is, 5. The miles per hour are the N. A. A. M. standard speed ratings. Five hours is taken as the total daily running time, as in general trucking service about one-half of the ten-hour day is consumed in waiting for loading and unloading and other delays.

Dividing the daily cost of operation by the ton miles of work performed gives the ton-mile cost in cents shown in column 7. It is noteworthy that the rate drops gradually from the 1-ton size to the 5-ton size, and then gradually increases to the 10-ton size.

As nearly as can be calculated from information at hand, the cost of doing work with horses is as follows:

COST OF TRUCKING WITH HORSES

Tons	Team (horses)	Daily Rate	Miles Per Working Day	Ton Miles	Ton-Mile Rate (cents)
1	1	$5.50	16	16	34.37
2	1	6.50	16	32	20.31
4-5	2	8.50	12	48.60	17.70-14.16
8-10	4	17.50	12	96-120	16.35-14.58

According to this table, based on statements furnished by professional truckmen, it costs twice as much to do work with horses as with motor trucks, even allowing only five hours running per day for the power vehicle. The horse figures show the average maximum day's work for animals, but if the waiting time of the motor truck is cut down one-half by quick-loading methods its work capacity is increased one-half and the ton-mile rate decreased proportionately.

If it is conceded that the charges for demonstrating motor trucks should be higher than the actual cost of operation it is found that a schedule one-quarter higher gives the scale shown in the dotted line in the chart, ranging from $10.62 a day for a 1-ton truck to $23.12 a day for a 10-ton truck.

As this is an awkward scale of dollars and cents, the scale shown in the solid line, ranging from $10 a day for a 1-ton truck to $25 a day for a 10-ton truck, has been adopted by the N. A. A. M.

Body Weight Resolution Passed

A body weight allowance resolution has also been passed. Allowances made for weights of bodies on motor trucks without reducing the rated allowable freight carrying capacity of the chassis should be sufficiently large to embrace all ordinary types of bodies commonly used in the different trades employing power vehicles. Consequently it was resolved that the minimum scale of body weight allowances based on stake type bodies, as adopted at the March meeting of the National Association of Automobile Manufacturers, be revised in accordance with the following scale representing approximate averages of weights of all styles of bodies commonly fitted to chassis of the different capacities, to wit:

Load Capacity (pounds)	New Body Weight Allowance (pounds)	Former Body Weight Allowance (pounds)
1,000	600	500
1,500	750	...
2,000	900	600
2,500	1,000	...
3,000	1,050	700
4,000	1,200	800
5,000	1,350	900
6,000	1,500	1,000
7,000	1,600	1,100
8,000	1,700	1,200
9,000	1,750	1,300
10,000	1,800	1,400
12,000	1,900	1,600
14,000	2,000	1,800
16,000	2,100	2,000
18,000	2,200	2,200
20,000	2,300	2,400

Some Papers Read at the

On Standard Truck Warrant

THE papers read at the convention of most interest to readers of this magazine were "The Need and Benefits of a Standard Truck Warranty," by L. H. Kittridge; "Terminal Delays," by David Beecroft, and "Injudicious Methods of Selling Commercial Vehicles," by M. L. Pulcher.

Mr. Kittridge began his paper by stating that harmony and uniformity should prevail in all selling practices, and that the warranty or guarantee is a necessary adjunct to an industry still in its infancy. The necessity for such, however, will become less as the industry grows. Mr. Kittridge considers that the willingness to go further than competitors in the matter of guarantees is the sign of weakness because it merely holds out an additional inducement for a presumable purchaser to buy. This point is not likely to occur to the ordinary buyer. But if the latter would think he would see that the most liberal guarantee would not make a good truck out of a poor one, and that free repairs are less to be desired than no repairs.

Lack of Uniformity in Guarantees Is Bad

The lack of uniformity in guarantees is a sign to the purchaser that the industry is in an unsettled condition. Selling conditions should be uniform, and quality and price rather than the nature of the guarantee should be the object of all. Another point is that difference in guarantees is a temptation to the owner for claiming an immoderate number of repairs.

Difference in warranties gives rise to general ill feeling. What the industry is in most need of to-day is co-operation, and this will be partly brought about by the adoption of a standard guarantee in so far as selling policies are concerned.

> The letter and intent of the N. A. A. M. warranty are to confine the maker's responsibility to the replacement of parts showing defective material and workmanship under normal use.
>
> That is all that a warranty should do—make the manufacturer responsible for construction, and leave to the purchaser the responsibility for its proper use and care. This should not be construed as relieving the manufacturer or its agents from the necessity of giving all necessary or desirable instruction to users in the operation and care of the machines which is essential to the successful introduction of commercial vehicles.

The standard warranty also aims to do away with the verbal promises and even written contracts that are rashly made by over-eager salesmen, going further than the guarantee authorized by the factory.

> The standard warranty, which has been drawn with the utmost care and is as brief, direct and clear as it is possible to make it in order to meet all requirements, has a large protective value to the manufacturer as well as to the consumer. But in order to preserve this feature it is necessary that some evidence should exist that the purchaser of the truck has had the warranty called to his attention and then given ample opportunity to read it. This can best be accomplished by printing the warranty in every catalogue issued and on the face or back of every sales contract or else by inserting a clause in the body of the contract referring specifically to the "Standard Motor Truck Warranty of the National Association of Automobile Manufacturers, Inc."

Wagons Waiting at New York Railway Dock

N. A. A. M. Convention

Delays at Terminals, etc.

THE paper by Mr. Beecroft dealt with a subject which cannot fail to be of interest to every user of a motor truck. Perhaps the importance of the subject can best be understood by quoting the following statement by J. F. Barron, freight agent of the Illinois Central Railway Chicago depot: "If motor trucks were used exclusively at six of the big railway terminals of Chicago for bringing freight to depots and taking it away from these depots the work could be done in one-half the time at present required and at one-third of the cost."

In order to prove the truth of this statement investigations have been conducted simultaneously in New York, Chicago and Detroit, centering around the river docks and the freight depots. The result has been extensive tabulations, some of which will be reproduced later, which prove not only that the statement quoted above is correct in respect to Chicago, but also in connection with New York City, Detroit and probably other large centers. From observations it is gathered that the loss of time is due to the four following causes:

First—Loss of time because of congestion in the streets leading to the depot and from it, this congestion sometimes being due to lack of adequate police control; at other times because of too narrow street; and, again, caused voluntarily by the drivers.

Second—Delay due to trucks waiting in line to reach the unloading or loading platforms at the freight depots, caused generally by long waits for bills of lading, not sufficient unloading platforms and doors for the freight houses.

Third—Loss of time in unloading; due to one man often having to do the unloading of a 5-ton load; due also to not having enough hand trucks inside the freight depots; due, further, to a deplorable lack of internal systems within the freight sheds, and also due to a lack of clerical force of the freight house to properly care for the various shipping documents and bills of lading, it being not uncommon to see lines of teamsters waiting for one hour to get these documents at the dock terminals in New York City, and which is almost as bad in Chicago.

Fourth and last—The driver: He is the human factor in the case; often he is the czar of the situation, and generally he is the greatest waster of time in the entire freight system of a city.

Example of Delays at Terminal

Of the first cause Mr. Beecroft gives in his paper four examples, one of which we quote:

One example will suffice: At a Chicago depot the street was blocked for over an hour so that not a vehicle could enter or leave the depot. The drivers passed the time of day among themselves and did not make the slightest effort to relieve the situation. One hundred and fifty-five wagons were in this blockade for exactly 1.5 hours, and when the clock showed after 11 in the morning, the drivers themselves broke the blockade, and in less than 5 minutes. These same drivers aim at handling but three loads per day; they know how much time they can waste, and they aim at doing this whenever the opportunity presents itself. One police officer could have avoided the situation, but several of the drivers suggested when spoken of the matter, that a policeman would not bother them. The drivers of horse vehicles do not object to waits only when they are infringing on the necessary time to make the three trips per day.

With regard to the second cause of lost time, vehicles have to wait after they arrive at freight house until they can get to the unloading door, and the length of this period varies according to local conditions. Observations taken in New York, Chicago and Detroit showed that of 287 vehicles checked, the average delay was 11.3 mins. Naturally Detroit showed the shortest delays, averaging 3 mins. Delays were longer at the three Chicago depots visited, averaging 6.21 mins., 7.2 mins. and on a busy forenoon 25 mins. In New York City the waits averaged 10 mins. and on another day 15.5 mins. These averages must not be taken as giving an absolutely correct idea of the situation, because the busy time is nearly always confined to one part of the day; consequently, this would make the average higher.

Wagons Waiting to Ship Freight at New York Dock

The following incidents noted at the Illinois Central freight depot will illustrate this cause of delay:

At about 2 o'clock on the afternoon of November 11th there was every appearance of the transaction of a great amount of business, though as a matter of fact but little was actually being done. A large number of the trucks and wagons were standing idle with no one about to watch them. A nearby saloon furnished the solution of the laxity and delay, for here was assembled a dozen or so of the teamsters. Lunch time was over, but that seemed to make but little difference since, as explained before, three trips marked the limit of their day's work.

[illegible] and the motor truck drivers seemed to be full of the idea On the other [illegible] possible. The horse driver knows the limit of of getting away as soon as [illegible] truck driver knows that his day's work and his day's mileage. The [illegible] spend his mileage is only limited by the number of minutes which he can [illegible] on the road and that he has to report to his shipping clerk each night giving reasons for any delay. The motor truck driver as a rule is also of a higher type of man than a mere teamster and has more interest in accomplishing his work well. At a point where earlier in the day a horse driver had backed his wagon into the wall next to an open door where another wagon was unloading so that the driver could have a sleep, the motor truck driver backed his machine in at an angle, getting the tailgate near enough to the door so that he got off his light load by hand. This took more time in unloading than if it had been done by hand truck, but it saved the motor truck the delay of waiting until the horse wagon got out of the way.

Loss of Time in Unloading

The third cause, loss of time in unloading, is nearly always due to the laziness of the horse driver, to a large degree engendered by the horse-pace methods to which the driver has become accustomed.

The drivers, as a rule, map out the day according to the work which they have to do, and see that they take all day over it; in most cases it could be done in less than half a day.

Other delays are inside the freight station. There is a scarcity of men for unloading and also a scarcity of hand-trucks. In practically every case but one man was used to unload a wagon, and by a peculiar ruling truck drivers were forbidden to enter the warehouses, and merely delivered the goods off the tail-gate of the wagons. Sometimes the lack of a small hand-truck held up the whole system.

Some of the railroad companies have recognized the loss of time in loading and unloading and are working to correct the abuse. A notable example of this was one in a Chicago depot which has aimed at getting their freight handlers within the depot working at higher capacity.

Since the recent strike was settled a new wage schedule has gone into effect whereby the men receive extra compensation for every increase in the amount of business handled over a certain set standard determined from experience before the strike. Thus at the present time the hand truckers on the platform do not idle but co-operate in every way to get the greatest amount of business done during the working hours. Also a new system of unloading wagons has been inaugurated during the latter part of September. Here a truckman with a hand truck takes a box or the like from the pile on the floor which has just been taken off of the wagon. With the hand truck he carries this box to the car proper to the destination at one end. Having delivered the box, instead of walking back to the starting place empty handed, he takes the truck nearest him with a load going back to a platform as near as possible to his original place. From here again he goes back for his second hand truck load from that point. In this way idle steps are eliminated. When a box is put on a hand truck it is not taken off until it is delivered at its final destination. It is a commendable example of motion study.

Loss of Time Due to Driver

The fourth, and perhaps the greatest, cause of delays at terminals is due to the driver, and this is one of the most serious factors that a truck manufacturer has to contend with. The driver must either be weaned from his horse-pace habits or must give way to a new driver who understands the economics of motor traction.

At the end of his paper Mr. Beecroft stated that it has been found that the Chicago railroads are anxious to co-operate with any movements of reform that are undertaken.

Owing to limitations of space we are unable to quote further from these interesting and informative papers this month, but propose to continue this article in the January issue in which some of the tabulations will be reproduced.

with a schedule, in column 4, of uniform approximate average costs for all truck sizes. The costs are also plotted in a chart published by the Association.

The work done by each size of truck is shown in ton miles in column 6. The ton-mile capacity of a truck in a working day is assumed to be the tonnage rating of the vehicle (column 1) multiplied by its speed in miles per hour (column 5) times one-half the number of working hours, that is, 5. The miles per hour are the N. A. A. M. standard speed ratings. Five hours is taken as the total daily running time, as in general trucking service about one-half of the ten-hour day is consumed in waiting for loading and unloading and other delays.

Dividing the daily cost of operation by the ton miles of work performed gives the ton-mile cost in cents shown in column 7. It is noteworthy that the rate drops gradually from the 1-ton size to the 5-ton size, and then gradually increases to the 10-ton size.

As nearly as can b[illegible] approach of the holidays and also the prospect of cold weather.

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On Standard Truck Warranty

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[illegible] of the approach of the holidays are shown by the active buying by the department stores and similar business houses affected by the season.

Trade Booming in Philadelphia

PHILADELPHIA, PA.—The uncertainties associated with the national election affected the commercial vehicle situation during the past month, but while at first the political change of administration was viewed with alarm, there was only a momentary halt, and as business has since kept picking up, confidence in the future has been freely shown. Sales for the month of November will compare favorably with those of any previous month and indications point to a record-breaking Christmas trade.

Future prospects are excellent, though the announcement made by President-elect Wilson that he will call a special session of Congress to take up revision of the tariff is the cause of considerable speculation. Continued activity is expected, however, and preparations are being made to handle an increased volume of trade. The more optimistic predict a shortage in the supply of cars.

The Ford Motor Co. has over 300 cars in process of assembling at the new assembling plant here. The Longstreth Motor Car Co., local handlers of the Alco trucks, has removed into larger and more commodions quarters. Sales are being made mostly in single lots.

Within the past month the International Motor Co. has had a repeat order of four Saurer trucks from the Baldwin Locomotive Works, making a total of ten sold to that company in the past 90 days.

Pittsburgh Business Not So Good as Expected

PITTSBURGH, PA.—Fall business with commercial vehicle concerns in Greater Pittsburgh has been fair, but not so good as was expected. The volume of inquiry has been first class. The trouble seemed to be to get enough interest in prospective purchasers to arrange for a demonstration and then to close up the sale contract. Most of the buying on the part of the department stores, caterers, laundry firms, breweries and coal companies was done early in the season. Pittsburgh has been viewing all summer a large number of these new vehicles, especially those used by the big coal companies and some purchased by the wholesale grocery concerns. Almost uniform satisfaction is reported from these purchases. The question of cost of motor haulage compared with delivery by horses has been settled in favor of the former. Nearly every large concern that has made close comparisons this year has decided in that way. As a result the Pittsburgh agencies point out the fact that there is sure to be a much greater trade in motor vehicles here next year than there has been at any time in the past. Business conditions are good; wholesale houses are being enlarged and some of them are opening new branches, and the immense amount of money being spent on the improvement of Pittsburgh streets will in itself add greatly to the prestige of the motor vehicle. During the past year the streets of the lower Northside have been raised to flood level; South Eighteenth street has been made a desirable hauling thoroughfare; outer Second avenue is being leveled to conform with the new undergrade crossings; West End streets have been raised; the Hump is being removed; a general traffic tunnel has been decided on for the South Hills, and the new Point Bridge is more than half completed. These improvements are suggesting to wholesalers that the purchase of motor trucks will be the most logical item in their 1913 expense account.

The two Pittsburgh motor shows to be put on the first week of March, one by the Pittsburgh Automobile Dealers' Association at the East End Rink on Larimer avenue, and the other by the Pittsburgh Auto Show Association at the Exposition, are both going to cater largely to the commercial trucks. Last year so much interest was manifested in these displays that many voted them the most successful part of the respective shows.

Quiet Month in Winnipeg

WINNIPEG, MAN.—Nothing of special importance has been done in the commercial motor circles during the past month, but the demand for all classes of vehicles has been fairly steady. Among the trucks delivered during November were a 5-ton White dump body truck, which will be used by a local firm of coal dealers for the delivery of coal to the big wholesale houses in the city. Several light delivery vehicles have been sold to retail stores and the *Free Press* of Winnipeg has added another truck to its fleet for the delivery of newspapers in the suburban districts.

Registered Trucks in Washington Number 550

WASHINGTON, D. C.—The commercial vehicle business in Washington for the first 9 months of 1912 has exceeded even the most sanguine expectations of the dealers. This assertion is borne out by the facts. Different dealers visited were asked two questions, as follows:

"Has the 1912 business come up to expectations?

"Has the 1912 business exceeded that of 1911 to the extent anticipated?"

Invariably the response was that not only had the 1912 business, up to December 1, been all that was expected, but that by comparison with the sales made during 1911 it had proved beyond the shadow of a doubt that commercial vehicles are now firmly established as an absolutely necessary

A. A. M. Convention

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Both the gasoline and the [illegible] required and at one-lar. Different large local corporations engaged in varied lines of business, as well as the government departments, have bought both kinds. Woodward & Lothrop, probably the largest department store in Washington, now has in use thirty commercial cars. Not long ago its business was handled entirely by horse-drawn vehicles. It is displacing the horse for the truck as fast as it can conveniently do so. The government printing office displaced seventeen horses in one day for commercial trucks.

The salesrooms in Washington at which commercial cars are handled are all prosperous and are looking forward with confidence to the 1913 season.

The users of commercial cars are proving themselves remarkably well posted on the various points involved in the make-up of a truck, indicating that the subject is being given much study and attention. That the commercial car industry is only in its infancy and that uses for it not now dreamed of will develop, is the opinion of both dealers and users.

New Orleans Accepts the Commercial Vehicle

NEW ORLEANS, LA.—While November sales have been slightly less than those of October the increase over November of last year is so marked that there is no doubting that even conservative New Orleans has accepted the commercial vehicle as an economy rather than a luxury. Previous to now the reverse was true. With this port handling a tonnage second only to New York there is still a great field to conquer. Adoption of motor traction by many firms here must await street improvements. Many sections of the wholesale and harbor districts are paved with the rough flagstones used as ships' ballast. Motor trucks cannot be operated continually over this surfacing without ruinous deterioration; this has been proven. Factories or wholesale houses so located as to have average streets for hauling are rapidly adopting motor trucks. This buying movement has been the more marked since early in the year it was proven that goods could be handled to the docks cheaper by motor truck than by the belt railway. This remarkable showing is being maintained. Recording speedometers have removed one of the objections to truck purchases here. As negro drivers are employed almost exclusively cars were often abused when there was no way of checking their performance. The removal of this objection is certain to influence many sales in a district where absolutely reliable employees demand bigger salaries than could be paid to truck drivers.

November a Good Month in Louisville

LOUISVILLE, KY.—November has been a good month in local auto truck circles, actual sales being numerous, while prospects are sufficiently plentiful to insure activity for the truck men during the remainder of the winter. Money is becoming more plentiful in Louisville and Kentucky after being rather tight for a time. Bankers report funds coming

New York, Chicago and Detroit showed that of 287 vehicles checked, the average delay was 11.3 mins. Naturally Detroit showed the shortest delays, averaging 3 mins. Delays were longer at the three Chicago depots visited, averaging 6.21 mins., 7.2 mins. and on a busy forenoon 25 mins. In New York City the waits averaged 10 mins. and on another day 15.5 mins. These averages must not be taken as giving an absolutely correct idea of the situation, because the busy time is nearly always confined to one part of the day; consequently, this would make the average higher.

The following incidents noted at the Illinois Central freight depot will illustrate this cause of delay:

> At about 2 o'clock on the afternoon of November 11th there was every appearance of the transaction of a great amount of business, though as a matter of fact but little was actually being done. A large number of the trucks and wagons were standing idle with no one about to watch them. A nearby saloon furnished the solution of the laxity and delay, for here was assembled a dozen or so of the teamsters. Lunch time was over, but that seemed to make but little difference since, as explained before, three trips marked the limit of their day's work.

[illegible] and the motor truck drivers seemed to be full of the idea future through compe[illegible] The horse driver knows the limit of [illegible] the truck driver knows that The truck will be used principally in hauling [illegible] and street work.

Outlook Good in South and Southwest

MINNEAPOLIS, MINN.—J. H. Shields, sales manager for the H. E. Wilcox Motor Car Co., has returned from an inspection trip in the southwest. He said: "Business prospects have never looked better. Reports from branches show there is a steady demand for trucks. We have had an order every day for the past 6 weeks. It is evident the election has not affected the freight-moving business. More and more trucks will be needed each year and 1913 will see a big gain in that branch of the automobile business. Altogether I am well pleased with the outlook in the south and southwest, and I predict a big year for the truck business." E. O. Merchant, formerly with the United States Express Co. and later with a large department store's transportation department, has become city manager for the company in Minneapolis.

Truck dealers are preparing to take large space for the fifth annual automobile shown in Minneapolis in February. Five thousand dollars will be spent in decorating the Armory, in which the show space has been doubled since last year. Trucks will be on the main floor instead of the basement.

Street Improvements in Baltimore

BALTIMORE, MD.—Truck dealers in this locality find that business for the past month has been about on a par with that done during the previous month. There has been no great rush of sales, but the business has been such as to keep the dealers going at a nice clip. While sales and deliveries have not been causing the dealers to fall over themselves to make them, the dealers are pleased with the fact that prospects are very good for the future of the business. The truck business, in fact, while it has picked up wonderfully in the past 2 years, is still a thing for the future because of the peculiar conditions that prevail in Baltimore. Just now many of the streets are dug up in consequence of the laying of the new sewerage system, others are dug up for the purpose of supplanting cobblestone thoroughfares with up-to-date smooth paving in consequence of the expenditure of the paving and annex loans for this purpose, and these things, together with the numerous hills that characterize the Monumental City make the conditions just now not so excellent for trucks.

But the commercial vehicles are, in spite of this big handicap, making remarkable inroads on the horse-drawn vehicle and within the next year or so when all of the improvements now in the course of completion are made there is no doubt that the business will be at its height and that Baltimore business men and firms will have them in preference to horses and wagons.

MUNICIPAL SERVICE EXTENSIONS

Vehicles in Baltimore

Thirty-five Motor Vehicles and Fourteen Motorcycles in the Municipal Department

PERHAPS the progress of the motor truck is seen to no better advantage than in municipal work. If one takes a hasty glance at the equipment of the municipal departments of the principal cities of the United States one is immediately struck with the steady advance which is being made by these departments in rendering more efficient and less costly the work done in various branches of service. This can more plainly be seen by taking one town for an example and giving an exact statement of its present equipment.

Six Years Ago There Were No Motor Vehicles

In the city of Baltimore, for instance, 5 or 6 years ago there was not a single motor-driven piece of apparatus in the municipal department. Now there are thirty-five motor vehicles and fourteen motorcycles doing the work of all departments, and it is expected that this number will be doubled or even tripled within another period of 5 or 6 years. This points conclusively to the fact that with the incoming of the commercial vehicle for municipal work has dawned the elimination of unnecessary cost and the introduction of absolute efficiency. The city of Baltimore, in spite of bad streets, steep grades and other antagonistic influences, has recognized the superiority of motor-driven apparatus.

Of the thirty-five motor vehicles in use eleven are used in the fire department, twelve in the police department and the remainder in the departments in connection with sewerage, parks, opening streets, street cleaning and paving, building, subway construction, water, health, etc.

30-Horsepower White Ambulance, Baltimore

60-Horsepower Mack Truck, Baltimore Fire Department.

The first motor vehicle came into the service of the fire department in 1909, this vehicle being a 40-horsepower White steam car for the chief, which was soon followed by another car for the deputy chief and a reserve car. The department has since added a 30-horsepower White ambulance, a 30-horsepower White roadster for the superintendent of machinery, two 60-horsepower Mack trucks in the high-pressure service, two 40-horsepower Mack trucks used as hose wagons, and two 30-horsepower White trucks for carrying supplies.

The president of the fire board is a staunch adherent of the motor truck and would like to see every horse vehicle replaced by motor-driven vehicles. His opinion is that the great importance of the adoption of the latter is because of their far greater efficiency and speed in reaching a fire. Cost of initial expenditure should not be considered, but even if it is it is generally found that such cost will be repaid in a period of 2 or 3 years. The horse-drawn apparatus in the service of the city is, however, too good to discard, and this is practically the only reason which prevents the city from making a sweeping and immediate change. One point has been definitely decided upon and that is that not a single additional piece of horse-drawn apparatus shall be purchased; everything that is bought in the future will be motor driven.

Horses Could Not Possibly Manage Service Trucks

An example of the higher efficiency of the motor apparatus is given by the president. The high-pressure service trucks are so heavy that six horses could make no speed with them, and yet under their own power they make 40 miles an hour.

As stated above, in the fire department efficiency stands first, but this does not mean that costs and convenience should be entirely overlooked. This remark practically refers to all municipal service. The practice of the municipal authorities of Baltimore is that immediately a request is put in for a motor vehicle by some department, examination is made as to whether there will be sufficient work in that department to keep the vehicle going; if the examination is favorable then the motor vehicle is purchased. As a result of this all motor vehicles now in use have given perfect satisfaction.

Motor Vehicles in the Police Department

A 60-horsepower Locomobile patrol wagon was added to the police department in 1909 and since then so successful has this wagon been that three more of the same kind and five 40-horsepower Locomobiles have been put in service. All of the patrol wagon service is now done by motor vehicles. Besides these machines the marshal has been given a 38-horsepower Locomobile and the linemen of the department have been given a 30-horsepower White gasoline truck. Seven 4-horsepower Indian motorcycles are used by traffic men. The police department has been very careful in compiling statistics in regard to the cost of operation and maintenance of their motor vehicles, and elaborate reports have been prepared in each of the eight districts of the city, showing mileage, cost of repairs, tires, etc.; in fact, every item is included. The statistics show that the cost of maintenance of all the motor vehicles in the service of the police department is equivalent to 12 cents per mile. The statistics of the horse-drawn vehicles, as far as can be estimated, show a cost per mile of 11 cents. On the basis of 100,000 miles per year for all of the machines there would apparently be a saving of $1,000 in favor of the horses, but when it is considered that there are 17 drivers for the motor vehicles as against 19 drivers for the horse-drawn vehicles, this $1,000 is made up; consequently it may be assumed that the horse patrol and the auto patrol work out to the same cost per mile. But where the auto patrol is so infinitely superior is in service. The police patrols, too, are used frequently for ambulance work, and the difference of a few minutes in getting to a hospital may mean life or death to the passenger.

Locomobile Truck Used as Patrol Wagon, Baltimore

30-Horsepower White Supply Truck, Baltimore

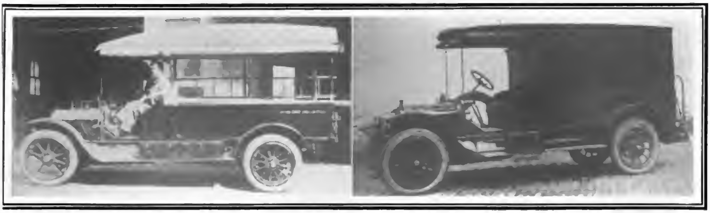
The cost of maintenance has been materially reduced by the installation of a repair truck equipped with lathes and tools, and although it has only been in use 2 years it has already more than paid for itself.

The greatest expense is for tires, these costing not less than 5 cents per mile. Gasoline is also a heavy item, the 60-horsepower cars using a gallon, at 15 cents per gallon, to every mile they run.

City Jail Van Is Proving Useful

A motor vehicle that has only been in service 6 months, but which has already proved a very good investment, is the city jail van, in which the prisoners are carried between the jail and criminal court. The van, a 30-horsepower White gasoline car, has run more than 15,000 miles on one set of five tires, and not one cent has been expended on repairs. The car makes on an average half a dozen or more trips a day and the round trip amounts to 2½ miles. Also every day the car makes a trip to the insane asylum, a round trip of nearly 15 miles. With a horse-drawn van, which the motor vehicle has replaced, this trip took about 3 hours; now it only takes a little more than an hour. In addition to increased speed there is also more room in the machine, 17 prisoners being carried at a time at 20 to 30 miles an hour, comparing with 10 prisoners carried by the horse van at a speed of 5 miles an hour. The horses and wagon cost $750 a year to maintain, and it is expected that a large saving will be found when the cost of the motor vehicle is estimated at the end of the present year.

At present the new vehicles in the service of the municipal departments are stored at different places, but next year there will be a municipal garage where all of the motor vehicles will be kept. This will do away with the special department car, as all of the cars will be at the garage at the service of those who need them. The city will also save money by being able to have fewer men to look after them and shops will be established for minor repairs.



White Gasoline Car Used by Linemen of Police Department; and White Jail Van, Baltimore

New Commercial VEHICLE MODELS

SANFORD CO. BUILD 1-TON TRUCK

THE Sanford Motor Truck Co., Syracuse, N. Y., is at present building but one model, that being of 1-ton capacity of the motor-under-the-seat type. With the gearset and clutch, the motor forms a unit power plant, suspended at three points.

Either a stake or express body can be supplied with this chassis according to the requirements of the purchaser. The vehicle has a 106-inch wheelbase and a standard 56-inch tread.

A four-cylinder four-cycle motor, with a 4-inch bore and a 4½-inch stroke, equipped with an automatic sealed governor which limits the motor speed, is used. Ignition is by a Splitdorf high tension magneto, and lubrication is by a self-contained oiling system which maintains a constant level in the base of the crank case. The oil pump, which forces a stream of oil to all bearings, is driven by the timing shaft.

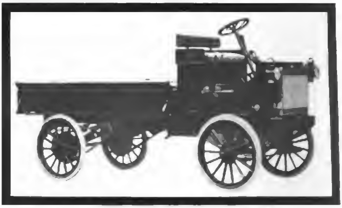
The clutch is multiple disk in type and is oiled by the force feed oiler. Gears and shafts of the three speed selective sliding gearset are of special steel with Hess-Bright bearings. Dual side chains rotate the rear wheels.

Service brakes are mounted on the jackshaft and the emergency brakes on the rear wheels.

The frame is of channel steel and an I-beam front axle is used, the rear axle being solid.

Springs are semi-elliptic in front and platform at the rear; all spring bolts are fitted with grease cups.

The wheels, of artillery type, run on Standard roller bearings. Solid tires 36 by 3½ inches are fitted to both front and rear wheels.



Sanford 1-Ton Truck with Flare-Board Body

THE ADAMS CO.'S 1913 MODELS

FOR 1913 the commercial vehicle models to be turned out by the Adams Brothers Co., Findlay, O., will consist of three sizes, a 1-ton, a 3,000-pound and a 2-ton vehicle. The latter is the latest addition to the Adams line and complete specifications are not yet available for it; the other two models remain practically the same as last year in general features of design and construction. In fact, the only change of importance is the use of a multiple disk clutch.

The 2-ton model which will be put on the market in the near future will have a 30-horsepower motor. The wheelbase length will be 140 inches. Rear springs will be 50 inches in length. Dual solid tires, 36 by 3½ inches, will be used on the rear wheels and 36 by 4 single solid tires on the front wheels.

In conjunction with this line of vehicles this company carries in stock three standard body types and can build other styles according to the desires of the customer. The standard bodies are the platform, platform with stakes and express. The chassis of either the 1-ton or 3,000-pound model can be supplied in two wheelbase lengths, 121 or 136 inches. The inside measurements of standard bodies fitted to the 121-inch wheelbase of either model differ only slightly, those on the larger vehicle falling half an inch short of those on the smaller, which measure 8 feet 10 inches long and 3 feet 10 inches wide. On the 136-inch wheelbase, the maximum length of the body, measured from back of the seat, is 11 feet, while the maximum width of the body is 3 feet 9½ inches.

A 56-inch tread is specified for the smaller vehicle while the 2-ton car may have either a 56 or a 60-inch tread.

The motor, similar in both the smaller models, is placed in front of the radiator, under a sloping hood of the Renault type. Its four cylinders having a bore of 3⅞ inches and a stroke of 5 inches, are formed by a single casting, with water circulation between each cylinder.

An oil reservoir is formed by the lower half of the aluminum crankcase, the upper part of which contains the working parts of the motor. The oiling system is laid out to offer the advantages of the splash and force feed systems combined.

Water circulation through the cooling system is effected by a spiral, gear-driven, centrifugal pump. The fan is situated in the flywheel. Two filling caps are fitted to the radiator, one on each side.

A high tension magneto is used in the dual system of ignition, and the carbureter is a Schebler. Spark and throttle controls are mounted on the steering wheel and the location of the magneto and carbureter permits of their being connected directly to the steering post by two straight rods. A foot accelerator, in addition to the lever, controls the carbureter.

From the multiple disk clutch, the power is transmitted through the drive shaft with its universal joints to the gearset, which is housed in a single casting with the differential on the jackshaft, midway of the chassis. Double side chains convey the motive power to the rear wheels.

The service brakes operate on the jackshaft and the emergency brakes on the rear wheels.

The frame is of pressed steel 38 inches wide and both front and rear springs are semi-elliptic, being 2½ by 44 inches in size, the former, however, having eight and the latter eleven plates. Sheldon axles are specified.

The wheels, dual in the rear, are of the 36-inch artillery type. For the 1-ton vehicle the tire equipment consists of solid tires, single front and rear, 36 by 3½ and 36 by inches in size, respectively. Dual tires on the rear wheels 36 by 3 inches in size, are provided on the 3,000-pound truck but single tires of 36 by 5-inch size can be furnished if the purchaser so desires.

NEW 4-TON BAKER ELECTRIC TRUCK

A FEATURE of the 4-ton electric truck built by the Baker Motor Vehicle Co., Cleveland, Ohio, which is entirely new to the electric commercial vehicle is the encasing of the side driving chains in an aluminum oil-tight housing so that at all times the driving chains are running in an oil bath. Other distinguishing features of the vehicle are the suspension of the side dismantling battery from the frame and left-side steer and control.

The clear carrying space of this truck is about 60 inches in width and 180 inches long. It has a road clearance of 12 inches and carries a battery equipment of 42 cells of 17 plate lead battery. Its wheelbase is 130 inches and its tread 68 inches. On one charging of the battery, it is calculated, the truck will travel approximately 50 miles, making, when loaded, a speed of 9 miles an hour.

Encased in a dust and waterproof aluminum casing and of the continuous torque drum type, the controller provides five speeds forward and three reverse, a special safety device preventing accidental slipping into the reverse position. The controller lever is mounted on the steering post.

A series wound motor with an overload capacity of 300 per cent. is suspended from the frame back of the jackshaft, from whence it rotates the jackshaft by a Renold silent chain, running in oil in the unit housing which encloses it and the differential. The enclosed double side chains from the ends of the jackshaft to the rear wheels transmit the power to those members.

Two sets of internal expanding brakes operate on the rear wheels, the service brake being pedal controlled and the emergency brake expanded by the movement of a lever.

Adams Chassis, Showing Left Steer and Center Control

The chassis frame is of pressed steel. The battery cradle, being underslung, is supported by two longitudinal channel section steel braces which run from its forward end to a section of the chassis frame. A triangular steel truss reinforces the rear end of the frame.

An I-beam drop forged axle is used in front and a drop forged rectangular axle at the rear.

Springs, which are semi-elliptic front and rear, are mounted directly under the frame.

Single solid rubber tires, 36 by 6 inches in size, are fitted to the front wheels, while those in the rear carry dual tires, 36 by 3½ inches in size.

COMMERCE LIGHT DELIVERY VEHICLE

ANOTHER maker of friction drive commercial vehicles is the Commerce Motor Car Co., Detroit, Mich., whose model C 1,000-pound delivery vehicle has right-side steer and control, and may be fitted with either pneumatic or solid rubber tires.

Only one body, the panel style, is standard for this model, but other types can be mounted on the same chassis. The floor space of this body is 64 by 42 by 52½ inches, the last dimension being the height. The weight of the car without a load is 1,600 pounds, and the wheelbase measures 96 inches.

The four cylinders of the motor, placed forward under a hood, are cast in pairs, the magneto, carbureter, and exhaust valves being all located on the left side. The motor develops 20 horsepower and is water cooled. Ignition is by a Bosch high-tension magneto with a set spark. A Lavigne double plunger pump, connected to a double sight feed on the dash, maintains an oil level for the splash for rod and cylinder lubrication.

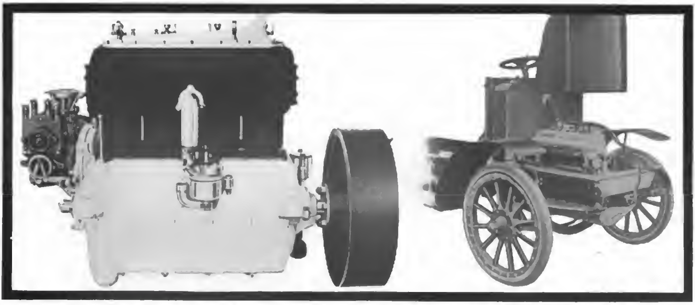
The disk type of friction transmission is used, a single chain conveying the propelling energy from the jackshaft to the rear axle. Internal expanding service brakes operate on the rear wheels, and the reverse of the friction disk acts as an emergency brake.

The frame is heavily braced and reinforced and is constructed of pressed steel.

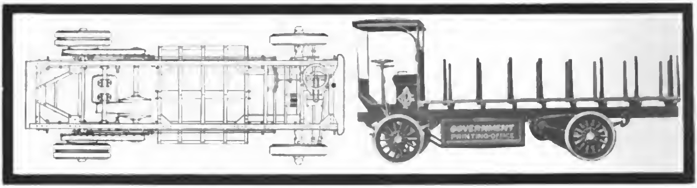
The front axle is tubular, while the rear axle with the center chain construction is live.

Semi-elliptic springs are used throughout.

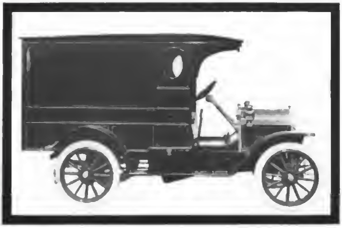
The wheels are of artillery type, those in front being fitted with ball bearings in the hubs. Either Goodyear pneumatic tires, 32 by 3½ inches in size, or Goodyear-Motz solid rubber truck tires, 34 by 2½ inches in size, may be used. The price is $875 with pneumatic tires.



Left Side of Adams Motor, Showing Carburetor; and Three-Quarters Right View of Adams Motor with Hood Raised



Overhead View of Baker 4-Ton Chassis, Showing Motor and Transmission; and Side View of Baker with Stake Body



Right-Side View of Commerce 1,000-Pound Wagon

PALMER-MEYER 1,500-POUND VEHICLE

FORMAL announcement of the marketing of a 1,500-pound delivery vehicle with a maximum speed of 25 miles an hour and solid rubber tires, has been made by the Palmer-Meyer Motor Car Co., St. Louis, Co., which is planning the construction of 300 of these vehicles during the coming year.

Three stock bodies are carried for this vehicle, the open box, express top and closed top bodies. The carrying space in the standard bodies measures 84 inches in length from the back of the seat. The wheelbase is 110 inches and the tread 56 inches. The steering wheel is located on the right side and the control levers in the center.

The four cylinders of the motor which are placed forward under a hood are cast in pairs with valves enclosed. The bore is 3⅝ and the stroke 4¾ inches, a longstroke type developing 26 horsepower.

In the constant level splash system of lubrication, a plunger pump placed on the side of the motor, maintains a fixed level of oil in which the connecting rods dip. The excess oil flows back to the reservoir when it is thoroughly strained. Cooling is by a centrifugal pump. A model L Schebler carbureter feeds the fuel to the motor, and ignition is by a Remy model R. D. magneto.

The clutch, of the dry-plate expanding disk type, gearset and motor form a unit power plant. The gearset is of the selective type with three speeds forward. New Departure double row annular bearings are used for the shaft mountings. Final drive is by double side chains to the rear wheels.

The service brakes are mounted on the jackshaft and are 10 by 1¾ inches. The emergency brakes operate on the rear wheels and are 13 by 1¾ inches in size. An I-beam forging is used for the front axle, and the rear axle is square. The pressed steel channel frame provides a three-point suspension for the unit power plant.

The springs are semi-elliptic and are 2 inches wide, the front springs being 36 inches and the rear 46 inches long. All spring eyes are fitted with lubricators.

The 34-inch wheels carry 34 by 2½-inch solid rubber tires in the front and 34 by 3½-inch solid tires in the rear.

NO CHANGES IN THE GARFORD MODELS

NO changes in the construction and design of its commercial vehicles for the coming year are contemplated by the Garford Co., Elyria, O., but as some of our readers may not be familiar with the features of the Garford trucks, a description of the 3-ton and 5-ton vehicles might be of value.

Both of these vehicles are of the motor-between-the-seats type and are chain driven, having right-side steer and control

When fitted with a driver's seat only, the weight of the chassis of the 3-ton car is 6,800 pounds. With a stake body on the chassis the weight is so distributed that 4,250 pounds will fall upon the rear wheels and 3,850 pounds on the front wheels, the total weight with the body being 8,100 pounds. In length, the loading platform measures 170 inches and in width 70 inches. The height above the ground is 50 inches when the truck is carrying a load. The overall length of the chassis is 217¾ inches, and that of the chassis and body together is 236 inches, on a wheelbase of 128 inches. The front tread is 61¾ inches and the rear 63 inches.

The weight of the chassis of the 5-ton vehicle, with the driver's seat in position, is 7,650 pounds. If a stake body is placed on the chassis the weight falling on the front wheels is 3,900 pounds, and the weight on the rear wheels 4,825, giving a total weight for chassis and body of 8,750 pounds. The minimum of the turning radius to the left is 26 feet and to the right 24 feet. In length and width the loading platform measures the same as that of the 3-ton model, and its height above ground when not loaded is 54 inches. The overall length of the chassis and body is also the same as on the lighter model. The overall width of the car is 86 inches, and the overall height is approximately 50 inches. The length of the wheelbase is the same as that in the 3-ton vehicle. The front tread is 61¾ inches and the rear tread 71½ inches.

In both these models the motor is the same, consisting of a single casting forming a four-cylinder, four-cycle power plant with its L-head eylinders having a bore of 4¼ and a stroke of 5¼ inches, and rated at 28.9 horsepower. Valves are on the right side and are enclosed. Low tension in type, the ignition system has two sources of current, a Geisler storage battery and a Bosch K 4 dual magneto with a variable spark. A gear pump driven from the cam shaft forces the oil to the three main bearings, the other parts being lubricated by the splash method; compression grease cups are provided throughout the chassis.

The clutch is of the cone type, faced with leather and provided with cork inserts.

The gearset is of the selective type and is suspended at three points, being bolted to the jackshaft housing in two places at the rear and also supported on the frame. From the jackshaft the driving force is conveyed to the rear wheels by double side chains.

For usual service, a pair of contracting brakes operate on the jackshaft, and for emergency control a pair of expanding brakes act on drums on the hubs of the rear wheels.

The frame is of pressed carbon steel and is of channel section. Both front and rear springs are semi-elliptic, the front being 48 inches long and 3 inches wide and the rear springs 50 inches long.

The wheels are of the wood artillery type, the 3-ton vehicle having 36 by 5-inch single solid rubber tires in front and 40 by 4-inch dual tires in the rear, while the 5-ton truck is equipped with 36 by 6-inch tires on the front wheels and 40 by 6-inch dual tires on the rear wheels.

MOON BUGGY CO.'S DELIVERY CAR

THE Jos. W. Moon Buggy Co., St. Louis, Co., is building a 3,000-pound delivery car with three body styles, namely, the open box, the express top and the closed top. This vehicle has left-side steer and center control, and is equipped with solid rubber tires. It has a maximum speed of 25 miles an hour.

The dimensions of the carrying platform are 36 by 104 inches. When empty, the weight falling upon the front wheels amounts to 1,225 pounds and that on the rear wheels 2,275 pounds. Distribution of the weight of the load is calculated for 2,275 pounds on the front and 4,225 pounds on the rear wheels. Wheelbase of the vehicle is 125 inches, and the tread 57 inches. The diameter of the circle in which the truck can be turned is 30 ft.

A Continental, model C, motor is used, it being placed under a hood in front of the dash. It is of the four-cylinder, L-head type, having a bore of 3¾ and a stroke of 5¼ inches; it is rated at 30 horsepower. A gear pump propels the oil through the lubricating system. In the cooling system a centrifugal pump actuates the flow of the water. A Remy magneto generates the current for the ignition, and a Stromberg carbureter prepares the fuel for the motor.

A cone clutch connects the motor to the three-speed selective gearset of the transmission, which terminates at the jackshaft in a bevel gear, the power being transmitted to the rear wheels by double side chains. Located on the jackshaft, the service brakes are 10 by 2½ inches in size. Emergency brakes are placed on the rear wheels and measure 12 by 2½ inches.

The frame is 4½-inch pressed steel channel section. Semi-elliptic springs are used in both front and rear, those in front being 39 by 2¼ inches and those in the rear 48 by 2¼ inches.

The front wheel tires are solid and are 36 by 3½ inches in size. Cellular tires, 36 by 4 inches, are used in the rear.

The illustration shows a Moon vehicle with a combination stake and box body with a canopy top. The overhead view of the chassis shows the left steer and center control, and, upon close examination, the location of the gearset will be seen.

IDEAL ANNOUNCES FOUR VEHICLES

FOR 1913 the Ideal Auto Co., Fort Wayne, Ind., announces four commercial vehicle models, a 1-ton, 3,000-pound and two 1,500-pound trucks with a line of three standard bodies. All of these models are of the motor-under-the-seat type, and have right-side steer and control. With the exception of the model F4, one of the 1,500-pound types, all of the vehicles have the selective sliding gear transmission. Model F4 has the planetary transmission. Pneumatic tires may be fitted to the other 1,500-pound model, which is known as Model I. The two larger models, the 1-ton and the 3,000-pound trucks, are known as Models H and G respectively.

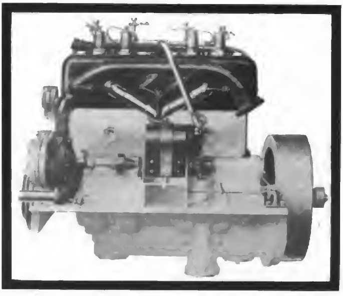
In addition to the three standard body styles, the company is prepared to build other bodies on special order. It should be noted by intending customers that these special bodies require from 4 to 6 weeks to build. All bodies are braced with steel to insure strength. Below is a tabulation of the inside dimensions of the different standard body styles:

Model.	Standard.	Maximum.
G	58" by 10' by 68" high	64" by 11' by 78" high
H	44" by 8'6" by 66" (canopy)	58" by 9'6" by 72" (canopy)
I	44" by 8' by 66" (canopy)	58" by 8'6" by 72" (canopy)

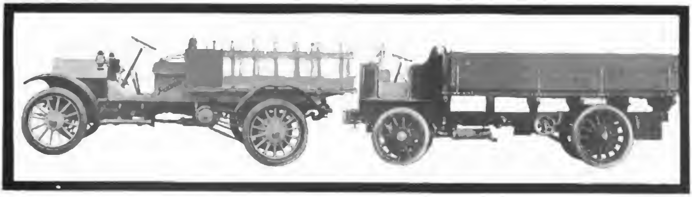
The standard size of bodies for the model F4 is 44 inches wide and 8 feet in length, measured from the back of the seat.

The different bodies are so designed that with the load evenly distributed 60 per cent. of the weight of the body and load will fall on the rear wheels and 40 per cent. on the front wheels. When the truck is fitted with an empty body of standard dimensions the weight is about evenly divided.

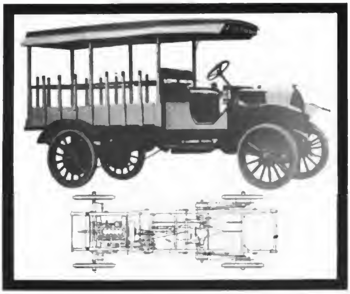
The length of the wheelbase of the model G is 124 inches,



Garford Motor's Left Side, with Magneto Fuel Leads



New Palmer 1,500-Pound Vehicle, Showing Right Steer and Center Control; and Garford 3-Ton Truck, Showing Location of Motor



Moon Truck with Body, and Overhead View of Moon Chassis

while the tread is 58 inches. Upon special order 14 inches can be added to the wheelbase. The tread of the model H is the same, but the wheelbase is 115 inches, one of 130 inches being built if the purchaser wishes it. A tread of 56 inches and a wheelbase of 109 inches are specified for the model I, while the model F4 has the same width of tread, but a wheelbase of 100 inches.

The speeds of the model G on the different forward gears are 11, 6¼ and 3¼ miles an hour at 1,000 r.p.m. of the motor. On the different forward gears the model H will travel at 11, 7½ and 4½ miles an hour at the same engine speed. Model I will make 12½, 8¼ and 4¾ miles an hour on its forward gears when the speed of the engine is 1,000 r.p.m.

The motor of the model G is a Continental model C, with a 4⅛-inch bore and a 5¼-inch stroke, giving 35 horsepower. Ignition is by a high tension magneto. The motive power for the models H and I is supplied by a Golden Belknap & Swartz motor with a 3¾-inch bore and a 4½-inch stroke, with cylinders cast in pairs and developing 25 horsepower. A high tension magneto is used in this model, with a variable spark.

Model F4 has a 20-horsepower four-cylinder, four-cycle motor. It is cooled by the thermo-syphon system. Ignition is by high tension magneto with a movable spark.

A leather faced clutch of the cone type, with springs under the facing, is used in the model G, while the clutch in model H and model I is enclosed in the flywheel and consists of a steel disk forged to the clutch shaft, with a Raybestos ring on each side. Flywheel and clutch are enclosed, dust tight, in motor housing, and run in oil.

The gearset and differential form a unit with the jackshaft, and with the jackshaft are hung on three-point suspension. New Departure ball bearings are used, and a ball thrust bearing is arranged to take care of any end thrust on the spline shaft.

Model F4 is not included in the above specifications, as it has the planetary transmission.

Double side chains are used on all the models to transmit the power to the rear wheels.

The emergency brakes on the model G are 14 by 3 inches, on the model H 12 by 2¼ inches, and on the model I 10 by 2½ inches. The service brakes are the same size in all these models, being 10 by 2 inches. Brakes are internal on the rear wheels on the model F4.

I-beam front axles are used on the models G and H, while the front axle of model I is rectangular, and that of the model F4 is square. All rear axles are square.

A pressed steel channel frame is used on the model G and the frames of the models H and I are of white ash bolted to angle steel. The frame of the model F4 is angle steel with a white ash sill.

Front springs on models H, I and F4 are three-quarters elliptic and on model G are semi-elliptic. Three-quarters platform springs are used on the rear of all vehicles, there being an auxiliary spring which comes into action only under heavy loads.

Wooden wheels of the artillery type are used on all the trucks.

All four models are fitted with single solid rubber tires throughout, an extra charge being made for dual tires on the rear wheels of the model G and for pneumatic tires on the models H and I. Standard equipment for the model G is 36 by 4-inch tires front and 36 by 5-inch tires rear. For the model H the tire sizes are 36 by 3½ front and 36 by 4 rear. Model I has 36 by 3-inch tires front and 36 by 3½-inch rear. Model F4 has 36 by 2½-inch tires front and 36 by 3-inch rear.

KEARNS BUILD 1,500-POUND WAGON

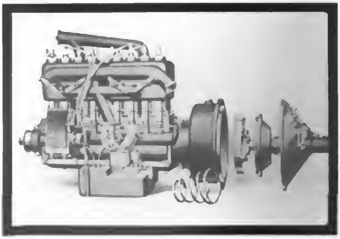
A DELIVERY vehicle of 1,500 pounds capacity, with friction drive motor-under-the-hood, right-side steer and control, and solid rubber tires will be built by the Kearns Motor Car Co., Beavertown, Pa., during the coming year. This vehicle, which weighs 1,900 pounds, ranges in speed from 1 to 20 miles per hour. Only one body style is carried in stock, but others can be built to order. Inside measurements of the stock panel body, taken from the back of the seat, give a length of 60 inches, a width of 41 inches and a height of 55 inches. The wheelbase is 100 inches and the tread 56 inches.

Either a four-cylinder, four-cycle, water-cooled or a three-cylinder, two-cycle, air-cooled motor may be used. Both types develop 20 horsepower, the four-cylinder type having a bore of 4½ and a stroke of 5 inches, while both bore and stroke are 4 inches in the three-cylinder type. The motor is lubricated by mixing 1 gill of cylinder oil with every gallon of gasoline.

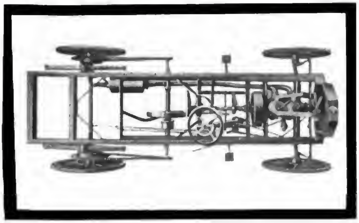
Unless otherwise ordered, a Schebler carbureter is supplied.

The power is transmitted to the jackshaft by the friction of a single disk against a composition plate. Double side chains convey the driving force from the jackshaft to the rear wheels. A band brake operates on each rear wheel, the emergency being by the reverse on the friction disk.

The frame is of oak, 1½ by 5 inches and is reinforced with angle steel. Square steel axles, fitted with ball bearings, are used. The springs, 1¾ inches wide and 36 inches long, are elliptic. The wheels, 34 inches in height, carry



Left Side of Ideal Motor with Clutch Parts



Chassis of Kearns Truck, Showing Friction Drive

34 by 2-inch solid rubber tires. A reduction from $1,225 to $975 in the price of this vehicle has been made recently.

A 1,600-POUND KOEHLER VEHICLE

IN a recent announcement the H. J. Koehler S. G. Co., New York City, has informed the commercial vehicle world that it has placed on the market a commercial vehicle of 1,600 pounds capacity with a two-cylinder, opposed motor under the floor boards, the left-side steer and center control. The radiator is mounted in front, forming the dash.

This new vehicle can be furnished with six types of bodies only one of these, however, the open flare board body, being furnished at the $750 price, an extra charge being made for the others. The inside of this body measures 44 inches in width, 84 inches in length from the back of the seat to the rear, and the flareboards are 17 inches in height above the floor. The body is strongly ironed throughout and is also ironed for the erection of a four-post canvas top, which can be supplied from stock.

Speeds range from 4 to 16 miles an hour on direct drive of this new car which has a wheelbase of 85 inches, a tread of 58 inches and an approximate weight of 2,000 pounds.

Placed under the floor boards of the body, the twin cylinders of the opposed water-cooled motor are protected from the dust and dirt of the road by a dust pan. The bore of the cylinders is 5¼ and the stroke 4 inches. The high-tension Bosch magneto of the jump spark ignition system is mounted above the motor and is driven directly by encased gears. A Schebler carbureter is specified. The thermo-syphon system of cooling is used. A gear pump in the base of the crankcase forces the oil through the lubrication system, one filling being sufficient for 300 miles.

In a direct line with the jackshaft the motor is connected to it by a double universal joint. The power is taken to the rear wheels from the jackshaft by double side chains. Both front and rear sprockets are of large diameter and are placed close together, allowing the use of a short chain.

All gears in the planetary system of transmission used are of chrome nickel steel, running with phosphorus bronze bearings on hardened shafts in semi-steel castings. The high-speed clutch is of the metal-to-metal cone type running in oil. The entire transmission is encased and running in oil. Both jackshaft bearings are in the same oil-tight casing that holds the transmission and are always in alignment and properly lubricated. Mounted on the jackshaft the service brakes have a metal-to-metal braking surface of 75 square inches. Emergency brakes are likewise metal-to-metal.

The frame is of channel section steel and is built in the shape of a U, extending in front of the vehicle. A metal floor plate connects the frame sides at the forward end, this acting as an additional support and brace for the truck.

Both axles are square, the front being 1¾ and the rear 2 inches in size. Semi-elliptic springs are used in front and elliptic springs in the rear. The wheels are of large size, the front being 36 inches and the rear 48 inches in height. They carry 2-inch solid rubber side wire tires on front and rear.

NEW 1,000-POUND CROW-ELKHART WAGON

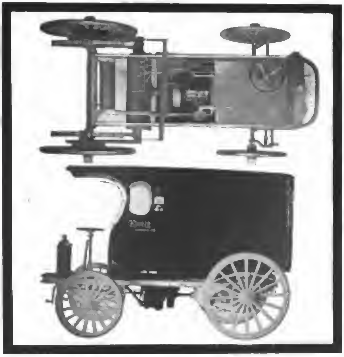
THE Crow Motor Car Co., Elkhart, Ind., which builds Crow-Elkhart commercial vehicles, has added to its line a 1,000-pound capacity delivery wagon with pneumatic tires and shaft drive and two body sizes.

For convenience in storing parcels, a removable rack is placed midway between the top and bottom of the enclosed body. The left half of the seat is hinged so that it can be raised up to allow long bundles, such as rolls of carpet, to project up to the dash, permitting the closing of the rear doors. The length of the smaller body, from the seat to the doors, is 46 inches, its height, 52 inches, and its width, 41½ inches. The larger body is 1 foot longer, but otherwise the measurements are the same. The total overall length of the vehicle is 149 inches. The loading platform when not loaded is 29½ inches from the ground and when carrying a load is 28 inches from the ground.

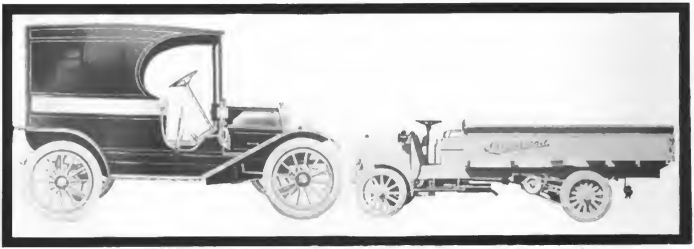
When the delivery car is empty, its total weight is 1,950 pounds, the weight being so distributed that 1,050 pounds fall upon the front wheels and 900 pounds on the rear wheels. When the vehicle is loaded, the weight falling on the front wheels is increased to 1,350 pounds and the amount of weight borne by the rear wheels becomes 1,600 pounds, or, in other words, 30 per cent. of the added weight falls on the front wheels and 70 per cent. on those at the rear.

The vehicle has a wheelbase of 114 inches and a tread of 56 inches.

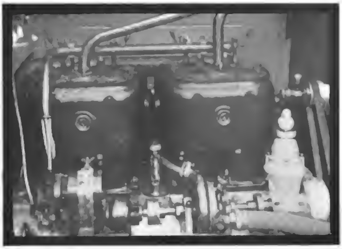
A four-cylinder, four-cycle motor with cylinders of the L-head type, cast in a block, supplies the motive power. Both the intake and exhaust valves of the motor are on the right side. Rated at 33 horsepower, this motor has a bore and stroke of 4 and 4½ inches, respectively. Lubrication is by the splash system, the oil being circulated by a piston pump. The thermo-syphon method of water circulation is



Overhead View of Koehler Chassis and Complete Car



Crow-Elkhart Delivery Vehicle with Panel Body; and 3-Ton Standard Truck with Flare-Board Body



Right Side of Standard Motor, Showing Magneto and Pump

used in the cooling system. A large aluminum fan rotates between the radiator and motor. A Briggs magneto and dry cells supply the current for the dual system of ignition. The model L Schebler carbureter is used in connection with the gravity fuel feed. An open faced Freer gasoline gauge under the front seat cushion indicates at all times the amount of gasoline in the tank.

The clutch is of the multiple disk type. The gearset is of the selective type with three speeds forward. Power is transmitted by shaft drive, propulsion being through the radius rods. Both service and emergency brakes are internal, the former operating on 12-inch and the latter on 8-inch drums.

The frame is of the channel type. Semi-elliptic springs are used in front and elliptic in the rear. Pneumatic tires, 34 by 3½ inches, are used on both the front and rear wheels.

STANDARD 3-TON TRUCK

The 3-ton truck built by the Standard Motor Truck Co., Detroit, Mich., has the left-side steer and center control and a maximum speed of 12 miles an hour.

Only the chassis is furnished to the purchaser, it being the general policy of this company to have bodies built by a body maker in the locality where the vehicle is to be used; if the purchaser wishes it, however, bodies can be constructed at the truck factory. The purchaser can choose from four wheelbase lengths, as the chassis is constructed in wheelbase lengths of 10, 12, 14 and 16 feet. He has his choice of 12 lengths of frame back of the seat for the loading space also, these different lengths being as follows: with the 10-foot wheelbase, minimum 8 feet 6 inches, standard 10 feet 3 inches, maximum 11 feet 9 inches; with the 12-foot wheelbase, which is the standard length, the minimum is 10 feet 3 inches, the standard 12 feet 3 inches, and the maximum 14 feet 3 inches; with the 14-foot wheelbase there is available a minimum length of 12 feet 3 inches, a standard length of 15 feet 3 inches, and a maximum length of 17 feet 3 inches; with the extra long 16-foot wheelbase the three lengths of frame are minimum 16 feet 3 inches, standard 20 feet 3 inches, and maximum 21 feet 3 inches. The chassis, having a wheelbase length of 10 feet, can be turned in a circle having a diameter of 46 feet; that with the 12-foot wheelbase in a circle with a diameter of 50 feet; that with the 14-foot wheelbase in a circle whose diameter is 54 feet, and that of the 16-foot wheelbase in a circle having a diameter of 58 feet.

A four-cylinder, four-cycle motor, carried in front of the dash, under a hood, forms the power plant. Exhaust and intake valves are located on the left of the twin castings that form the L-head type cylinders, and the magneto is on the right. With a rating of 40 horsepower, the motor has a 4½-inch bore and a 5½-inch stroke.

An Eisemann magneto with automatic advance takes care of the ignition. The carbureter is a Stromberg. In connection with the radiator and fan a centrifugal pump completes the cooling system. Lubrication is by the splash system, a plunger pump maintaining a constant level of oil in the lower half of the two-piece crank case. An oil lead goes to the timing gears and one to the rear main bearing.

Connecting the motor and the transmission is a multiple disk clutch of the dry-disk type, the disk being faced with Raybestos. The aluminum housing which encloses the gearset surrounds the clutch, forming a unit power plant with the motor. The gearset is selective sliding in type, its shafts operating on Timken roller bearings. Two Spicer universal joints are placed between the gearset and the jackshaft, on which are located the differential gears. From the jackshaft the power is conveyed to the rear wheels by double side chains.

On the outer ends of the jackshaft are the external contracting service brakes which work on drums of pressed steel, 12 inches in diameter. Pressed steel brake drums, 18 inches in diameter, located on the rear wheels, contain the emergency brakes, which are of the internal expanding type and are faced with Raybestos.

A 6-inch channel section forms the frame. The front axle is a Timken-Detroit I-beam with a guaranteed capacity of 4,500 pounds. The rear axle, which is rectangular in shape, is also of Timken manufacture.

Wheels conforming to the S.A.E. standard dimensions are used, and both front and rear tires are 36 by 5 inches in size, dual tires being used on the rear wheels.

SANDUSKY 1,500-POUND DELIVERY CAR

PNEUMATIC tires, left-side steer with center control and enclosed driving chains are some of the features of the model B 1,200 to 1,500-pound delivery car built by the Sandusky Auto Parts & Motor Truck Co., Sandusky, O.

Two body styles are carried for this vehicle, the open flare-board express body, however, being the standard equipment. Measured from the back of the seat to the tail gate, this body has a length of 90 inches and a width of 45 inches. The floor and flare boards are ironed with strips of strap iron. The truck, when empty, has a total weight of 3,200 pounds, of which 1,280 pounds fall upon the front wheels and 1,920 pounds on the rear wheels. Loaded to its full capacity of 1,500 pounds, and with the load properly distributed, the vehicle is so designed that 1,880 pounds of the total weight will be borne by the front wheels and 2,820 pounds by those in the rear, or 40 per cent. of the load weight forward and 60 per cent. on the rear. The inside measurements of the special body, which is of the panel type with rear doors, are 78 inches, length, and 42 inches, width, with a height of 62 inches. Special body equipment includes a cab for the driver. The wheelbase of the vehicle is 120 inches and the tread 56 inches. Overall length is 160 inches. When the truck is empty the top of the frame is 31 inches from the ground. A circle with a diameter of 35 feet is required for the turning of the vehicle.

Under a Renault type of hood, with the radiator forming the dash behind them, are the four cylinders of the motor in their single casting. A bore of 3¾ inches and a stroke of 5 inches are the dimensions of the long-stroke motor and its exhaust and intake valves are on the right side, while the magneto and water pump are on the left. Oiling of all bearings is by a circulating system by which the lubricant is admitted to the flywheel compartment from the reservoir on the lower half of the crankcase, and is thrown by centrifugal force into large open ducts or troughs which are cast in both the top and bottom of the crankcase. These ducts carry the lubricant to all bearings and to the crank dip compartments, the surplus returning to the reservoir.

A centrifugal pump, driven from the magneto shaft, circulates the water through the cooling system, in connection with which a fan forces air through the square tub radiator. Ignition is by a high-tension spark from a Remy magneto. An aluminum housing encloses the clutch which is of the cone type.

Between the motor and the gearset are two Spicer universal joints. Attached to the jackshaft housing is the three-speed gearset of the selective sliding type, fitted with annular ball bearings. The jackshaft housing is a steel casting, enclosing the bevel gear and differential, which are equipped with double and single row annular ball bearings. Roller chains encased in aluminum housings take the power from the jackshaft to the rear wheels.

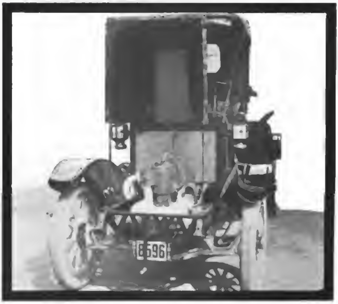
On the outer end of the jackshaft spindles, in drums, bolted to the sprocket spiders are the service brakes. These brakes have a diameter of 9 inches with a 1½-inch face, which is covered with an asbestos non-burn liner. The emergency brakes are carried on the radius rods, the latter being pivoted on the rear axle spindles, operating in drums on the rear wheels; they are 12 by 2½ inches in size. The frame is of pressed steel, channel section construction, braced at the corners with gusset plates; a sub-frame is provided for the motor mounting.

Semi-elliptic 38 by 2-inch springs are used in front and a three-quarters platform spring in the rear.

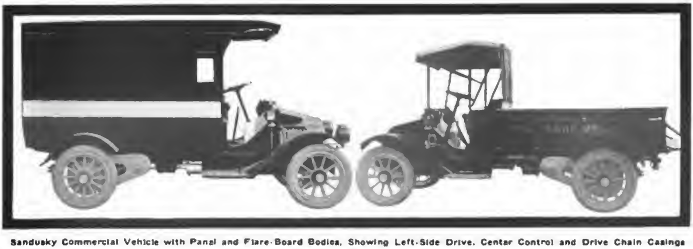
The front axle is an I-beam forging and the rear axle is of rectangular section.

Demountable rims are provided with 34 by 4-inch pneumatic tires in front and rear.

Accessibility of the motor and its parts is shown by the illustration of the front of the truck with the hood raised. The water pump and magneto can be seen on the left.



Front View of Sandusky Motor with Hood Lifted



Sandusky Commercial Vehicle with Panel and Flare-Board Bodies, Showing Left-Side Drive, Center Control and Drive Chain Casings

The READERS' FORUM

Types of Motor Tractors in Use

EDITOR COMMERCIAL VEHICLE:—We would like to know something about the construction, purpose and need of motor tractors, the extent to which they are used, what class of work they are most used in, etc.

To what extent are tractors being used in fire department work? It is our idea that they are most generally used for hauling heavy apparatus, such as steam fire engines, hook and ladder trucks, etc. Are we correct?—Charles H. Fuller Co., Chicago, Ill.

At present there are two types of tractors in use, the three-wheeled and the four-wheeled tractor. The three-wheeled vehicle is used in various lines of business, such as coal, lumber and contracting work, or in any line of business where the loads are extraordinarily heavy. Trailers are employed to contain the loads while the tractor supplies the power, and the steering apparatus. Some of them are used in fire department work, but their use in this service is not general.

The farm is the principal sphere of the four-wheeled tractor. Its purposes are varied in this service. It can be, and is generally used, for plowing, disking, sowing, reaping, and for hauling goods to market, either in its own body or with a trailer.

Any heavy motor truck may be used as a tractor, in that a trailer may be attached.

Steam fire engines are propelled by gasoline motors to a great extent, but these machines are not true tractors as they are built as a whole with the fire engine.

Electric Vehicle Solves the Problem

Editor COMMERCIAL VEHICLE:—In re-arranging my delivery service for complete motor truck transportation, I came across one condition which has given me considerable trouble. I am still in doubt as to what type of vehicle will best suit the requirements of my particular service. The locality which presents this difficulty is the lower east side of New York City, where, on account of the narrow streets, congested traffic and short runs between stops, I have always felt that a motor vehicle of large size would be at a disadvantage. My warehouses are located in the middle of the west side. Until recently I have felt that deliveries in the lower east side could be made at greatest efficiency by horse-drawn vehicles only, but I have since come to the conclusion that if it is possible to solve this problem with motor-driven wagons, I would much rather use them, for obvious reasons. I have at present two gasoline trucks of 3-ton capacity and a remnant of my horse-drawn delivery service, consisting of 12 wagons with 2 horses to each wagon. I find my two motor trucks much more economical in every way than the horse service and I desire gradually to do away with the latter.

The loads that the horse trucks take to the east side vary in weight according to the season of the year but the average is about 3 tons each trip, with about 60 pieces in each load. Each horse truck averages two trips every day, and the average number of deliveries on each trip is six. Eight horses and four wagons go to the district practically every day, as a horse truck can serve only a restricted territory and return to the warehouse. The time required to unload at the delivery points is very small in comparison to the running time.

Under normal conditions of traffic, etc., it takes each horse vehicle from 45 minutes to an hour to reach the first delivery point, about 1 minute per piece to unload, and about 3 minutes to go to the next delivery point. You will see that there is no idle time for the horse vehicles under this system, and, as the nature of the business demands early deliveries, they are made between the hours of midnight and 8 a. m. This allows only 1 hour leeway for the horses, and as there is practically no resting space for them, it is necessary during snowy weather, when the hauling is heavy, to substitute other animals when those on the road have returned from their first trip.

Here you have the problem in a nutshell: 24 tons of goods to go each day to a region of poor pavements, narrow streets, heavy traffic and short runs between stops. Eight hours each day in which to make these deliveries, the running time being 5 hours, the unloading time 2 hours and one hour to spare.

Can you inform me through the reader's department of your paper, what means I should adopt to solve this problem, and what type of vehicle is best adapted to the situation?—Butcher, New York City.

Without doubt the electric vehicle is the type required to solve your problem. It would seem that the condition of the pavements, etc., would call for the light gasoline vehicle, but if you can depend upon your drivers for fair treatment of the trucks under these conditions, the electric is preferable. If you should use gasoline trucks of small capacity for this service, frequent trips to and from the warehouses would be necessary and in this way too much time would be consumed. Larger gasoline vehicles would not be operating at their greatest efficiency on account of the short runs and frequent stops.

The solution of your problem consists in reducing the running time to a minimum, as the unloading time seems to be kept as low as possible under the present system, and retaining as far as possible the present load-carrying capacity, or increasing it. On account of the poor condition of the pavements, the narrowness of the streets, and the traffic conditions in the region of the deliveries, it would be poor policy to attempt to materially reduce the running time between stops, but, as the streets are in good condition between your warehouses and the first and last delivery points, and traffic is regulated in most cases by the police, the running time from your warehouse to the delivery point can be made much less.

The distance from your warehouses to the first delivery point cannot be more than 5 miles, and the total distance traversed from one delivery point to another will be about 2 miles, making a total of 12 miles each trip.

An electric vehicle of 3-tons capacity is governed for about 10 miles per hour. The use of a truck of this capacity and speed would therefore cut your running time down to an average of 30 minutes for the out-going trip. At such an early hour of the day, traffic on the intervening streets would hardly be heavy enough to cause any delays. Some time may be saved between stops, but the drivers should be cautioned against attempting to make more than fairly good time over poor pavements. The return trip can also be made in 30 minutes.

The division of time on one trip would under the above conditions be as follows: running time, 1 hour and 18 minutes; unloading time, 1 hour; making a total of 2 hours and 18 minutes. The second trip of the day would bring this total up to 4 hours and 36 minutes, leaving 3 hours and 24 minutes to spare in the working day. In this time a third trip can be made and there is a total of 1 hour and 6 minutes remaining. As you have not stated how long it takes to load the vehicle at your warehouses, we do not know how much of this time will be required for that operation, but it is certain that a load of this size and description cannot be put on in much less than 20 minutes if it has to be weighed and checked off, which will account for 60 minutes of the remaining time. Under these conditions there will be 4 minutes of overtime, for which an allowance can be made

Three electric commercial vehicles of 3-ton capacity should easily handle your lower east side deliveries and leave a margin for the expansion of your business.

Converting Horse Vehicles Into Motor Apparatus

Editor COMMERCIAL VEHICLE:—Noting conditions of delivery in this city and the amount of congestion of traffic which is present I find that it is extremely hard to make a motor vehicle pay, compared with horses, where there are many stops and short hauls. This is true because of the initial cost of the truck, so that it is too expensive for it to stand still. To my notion no motor wagon is built which fulfils the conditions required in this service.

The average load in laundry or grocery work, for instance, need not be over 800 pounds. When the grocer buys a horse and wagon to haul this load he is satisfied if the rig makes 15 miles a day with that load, and at a speed of 5 miles an hour. If he buys a motor wagon of the same capacity, however, he immediately gets the speed mania, and wants 30 miles an hour on hard tires. The truth of the matter is that the extra expense of a truck in such work over horses lies in speed and speed alone, and if the merchant were satisfied with horse speeds with a motor wagon he could buy a machine for the cost of a good horse and wagon that would do twice the mileage of a horse rig a day just the same and with less upkeep cost than with a 1-horse wagon.

Now consider a horse and wagon, the wagon worth when new $250 and the horse, say $200; total cost $450. Suppose the wagon as it stands were fitted with a twin cylinder motor-cycle motor which can easily be manufactured for $75, with a chain from there to a countershaft of cheap construction, with belts to the rear wheels like the old Holsman. Even a 4-horsepower single cylinder motor-cycle motor would pull this rig loaded, at 5 miles per hour, or horse speed, and hard tires would do quite well. Upkeep need not be more than $10 per month and the motor attachment altogether could be manufactured and sold to fit any 500-pound wagon for $300 at a fine margin of profit. Clutch effect would be obtained by drawing the real axle forward as in French cycle-cars. This arrangement would be cheap and good and any grocery could finance it. Isn't this an idea for someone?—C. E. J., Chicago, Ill.

There have been many devices tried for converting horse vehicles into motored ones but none to date have been successful. There are many true points in your argument but the proof of the pudding in this case, as in many others, would be in making a machine to your ideas and trying it out locally in actual delivery work. As shown the idea might meet with trouble during the winter months.

Selling the Electric Vehicle

Editor, Commercial Vehicle:—I will have to take issue with you on the proposition put forth in the leading editorial of The Commercial Vehicle for November, that salesmen of electric vehicles make a great mistake when they endeavor to bring out the superior merits of the electric truck in comparison with the gasoline truck, and that the fields of the two types do not seriously overlap in most cases. All such statements must be severely qualified, especially as the writer of this editorial continues by making the very hazy statement that in the city we have the field of the electric in all but emergency rush work, while outside of the city, and for long runs, the gasoline car should be used. Now what is meant by the "city"? A city like New York, Philadelphia or Chicago, where it may be from 15 to 20 miles from the eastern to the western limit, or from the northern to the southern limit, or a city like Toronto, where it is but about 9 miles from the east to the west limit and only about 4 miles from the north to the south limit?

Almost every writer who attempts in a motor truck journal to discourse on this subject takes this same stand and states, in very indefinite language, that the electric field is the city, where good pavements abound, without for a moment stopping to qualify this statement by mentioning the total daily mileage requirements of a concern in any given business, or the radius of action necessary to complete the deliveries from any given warehouse or user's plant.

In Toronto there are no long hauls, comparatively speaking, for the railroads, which do practically all of the hauling to and from their platforms to the wholesale houses, have yards in different parts of the city, with wagon equipment in these yards, so that all hauls are relatively short. It so happens, however, that until we assumed the agency for the Detroit Electric, electric trucks had not been exploited in Toronto, there being but four or five in use, while the competition in gasoline truck sales had been severe, and these had been sold to all concerns, where possible, without regard to the conditions of route or service required.

Most of these gasoline vehicles being built in the United States came in with a heavy duty attached, and as horses, feed and even wagons are somewhat cheaper in Canada than in the United States, and as the railroad charge for cartage has been but 2 cents per cwt., it has always been possible to hire hauling at a very low figure. The cost of operating motor trucks has, therefore, seemed much greater in proportion, and has constrained the users of commercial vehicles to make sure that the superior service should warrant the higher cost, which appeared in many cases, for the delivery of the goods. Appreciating these things, we have now made a strong start and sold several electrics, and it is the writer's opinion, based upon long experience in handling both gasoline and electric cars, and almost daily demonstrations in Toronto, that in this town at least, 85 per cent. of all of the hauling can be better done by electrics, and in this connection the writer states to each prospect interviewed that, as it is his opinion that an electric truck can be operated on good streets, mile for mile, and ton for ton, cheaper than a gasoline truck, and, within the mileage limit of the electric, for a full day's work, the question merely resolves itself into one as to whether or not the electric, on demonstration, will prove its ability to cover the ground and make the same deliveries in substantially the same time as the gasoline truck. If it will, then a comparison must be made in order that the customer shall arrive at a decision as to which type will do this given work cheaper. In other words, it is necessary for me to say to each prospect, in a city where gas trucks have been used mostly, "Let's see if the electric will do your work in substantially the same time, each day, as the gas car which has been demonstrated to you, or which is owned by you, the question of motors having been in your mind before we carried electrics, and, having settled this question in the affirmative, let's see which will probably make this delivery cheaper."

Almost all men are contemplating the purchase of motors, and a large proportion have had, at one time or another, a demonstration of some gas truck in Toronto, so it is improbable that I will not be immediately asked by the prospect to defend even my right to take up his time discussing the electric.

What is the usual development of this comparison, after the gas car men learn that I have interested the prospect? First, they tell him that frost and wet weather unfavorably affect the electric. Both we and our customers, some of them in Winnipeg where 40 below is but an appetizer, have proved this to be false and malicious, or, at the very least, ignorant and unposted twaddle. We use alkaline batteries mostly. Secondly, they tell him that the electric light company here, as well as its competitor, both use gas trucks in preference to electrics, when the truth is that these trucks are not used for delivery routes, but for rush work to points where repairs must be made. These companies will use electrics later on for meter installation, and other delivery work, and will tell all interested people as much.

Gas car salesmen have repeatedly stated to prospects in Toronto that our first customer for an electric, and our chief booster and help in closing several other sales, is not satisfied, that his truck is too slow, that it does not get the work out, etc.—this out of whole cloth, as his first delivery starts as late as 8.30 a. m. and yet the truck gets its daily work completed on the average at 4.45 p. m. and the factory is closed at 5 p. m. Can you beat it?

Comparisons in this city are inevitable, where all the work can be done by gas truck, but a great deal of it might be better done with electrics.

We find, in short, that in most cases in Toronto we have more than ample mileage capacity, with the easily boosted alkaline battery and the ability to finish the day's work as early as the gas truck. As the customer wants to get rid of the horse, he immediately asks for a comparison of the electric and the gas truck. Would you have us quit with the burden of proof placed squarely upon our shoulders and an array of as convincing talking points as any enthusiastic sales manager ever concocted? A. H. Dorsey, Toronto, Ont.

Number of Motor Vehicles Now in Use

Editor Commercial Vehicle:—Can you furnish us with figures or estimates as to the number of pleasure cars and motor trucks in use in the United States to-day, and their approximate horsepower?—L. W. E., LaPorte, Ind.

A recent compilation of statistics on the number of pleasure cars and motor trucks in the United States places the total number at 990,738, of which 35,978 are commercial vehicles and 33,842 electric cars.

The average horsepower is approximately between 30 and 35 per vehicle in use.

Truck Design from Driver's Standpoint

Particulars of Twenty-Seven Steering Gear Arrangements

THE question of the convenience of the driver is one that should have a big influence on the design of commercial vehicles, just as big an influence as it has in the case of pleasure cars. Present designs show that this point is being more and more considered, and in this article the good features and the defects are commented on in various arrangements of the steering gear, the most important point of truck design affecting the driver

THE efficiency of any piece of machinery depends on the man who operates it. A motor truck depends upon its driver for its success or failure, and whether it is to be a saver of time, labor and money, or an uneconomical factor. If the operator does not, for any reason, care for and operate it properly it will fail in the purpose for which it was constructed.

It would seem that designing a truck with an eye to the convenience, comfort, and safety of the driver is of paramount importance and is a point that should be considered carefully. As a whole the designs for 1912 show more evidence of thought than has been apparent in the past, and in most instances have been fairly well worked out.

It is true that shortcomings in truck design are often of apparently small consequence individually. But it is the little things that make up the bulk of the day's work, and an endless repetition of petty aggravations will in the end assume the proportions of a grievance against the truck and its equipment, and its makers and their antecedents unto the third and fourth generation. Such a grievance will react against the efficiency of the truck, as a man will not treat as well as he might a thing that he doesn't like, duty to the contrary notwithstanding.

Why it is assumed that a truck driver can and will endure more than the driver of a pleasure car is not quite clear. Possibly it is because the former earns his living by driving, must keep his job, and therefore cannot refuse to drive a vehicle that he does not like. But while the effect of poor design in the control of a truck may be slower in coming it is none the less sure. The control of pleasure cars has been well developed, and in most cases with the three ends mentioned in view. But saving time for the truck driver is more important. The design of motor truck control rightfully should have more attention than is given to pleasure cars if only for the reason of business before pleasure; and it should have at least equal consideration with the design of engine and gearset, as there is neither rhyme nor reason in equipping a vehicle with a first-class power plant and gears and counteracting their efficiency with ineffective and inconvenient means of operation.

In the accompanying table the measurements of a few of the representative models exhibited at a recent commercial show in the West are given. In this no attention is paid to the relative virtues of right and left side drive, or center and side control. The object is to discover the good and bad points of each with regard to accessibility and ease of operation, whatever the general design may be.

The most important, both for economy of operation and for safety for the truck and its driver, is proper control of the steering gear. On this depends the avoidance of bumps that give undue shock to springs and frame, the selection of the best part of the road that there may be the minimum wear and tear on tires, and escape from accidents in the emergency. Thus the driver's position at the wheel should be one of comfort, and such that he has good control of the wheel at all times. All other control devices should be designed and located with relation to this position that they may be operated without changing it, or with as little change as possible; and so placed that the operator may use his strength and muscular activity to the best advantage. Levers that require an uncomfortably long reach, pedals that are too near or too far and are set in an uncomfortable position, and spark and throttle control that is inconvenient to operate, all work against taking advantage of road conditions, tend to decrease efficiency in operation, and make it more difficult to save the vehicle from unnecessary strain and to maintain the correct engine speed under all conditions.

DIFFERENT ARRANGEMENTS OF STEERING GEAR

No.	Type	Height of Seat 1	Length of Steering Post 2	Distance From Post to Bottom of Seat 3	Distance From Post to Top of Seat Perpendicular to Post 4	Distance Between Seat and Rear Edge of Wheel 5	Diameter of Wheel 6	Distance From Pedals to Bottom of Seat 7	Height of Levers Above the Floor of Cab 8	Distance Between Seat and Handle of Gear Lever 9	Distance Between Seat and Handle of Brake Lever 10
1.	II	18	21	18	10	9	18	16			
2.		18	21	15½	18½	14	16	15½	22½	9½	9
3.	I	18	24	19½	12	9	14	14½	19	7	
4. Electric		18	28½	8½	7½	16	18½	19			
5. Friction drive	I	16	27½	4	4	11½	15½	17	17	3	
6. 2 ton LHD	I	18	29½	19½	11½	11	16	16	22½	4	16
7. 5 ton RHD	II	21	32	7	10½	11½	22	10½	26	14	14
8.	II	18	29	14	9	9½	18	16½	17	6	19
9.	II	16	31	24	14	11½	22	20½	22½	6½	24
10.	1	18	31	25	11½	7½	17½	12	12½	15½	12
11.	II	18	28½	11	9½	10	20	14	14½	15	24
12.	II	19	28½	15½	15½	6	24	15	18	6	21
13. Fire wagon	I	17	26	22	13½	6	17½	16	16½	12	8
14. 6 ton truck	I	18	26½	15½	12½	9½	21½	12	20½	7	17
15. Fire wagon	I	18	29½	14½	8½	9	22	12	19		
16.	II	19	26	9½	8½	7	22	13	19	16	19½
17. Fire wagon	I	19	28½	18	9½	7½	18	14	19	8	6
18. Fire patrol	I	17	32	22	12½	7½	18	17	18	12	14½
19. RHD CC.	I	20	28	11½	11	10	18	14½	14	4	4
20. Fire wagon	I	21½	24½	26	12	7½	18	12½	19	7	11
21. LHD CC	I	16	28½	12½	11½	14	22	18	22	7	11
22. RHD & C	I	18½	28	16½	8½	8	18½	17	23	5½	12
23. RHD & C	I	18½	26	20	13	6¼	16	15½	22	8	16
24. RHD & C	I	18	27½	13	10	10	16	14			
25. 1800 lb. LHD.CC.	I	16½	28	13	9¾	7¼	16	16	18	11	
26. 5 ton RHD & C	1	17	25	20	13	8	16	17	24	5	
27. 3½ ton Div. C.	1	17	27	18½	11½	10	18	13	22	6½	14

Owing to the irregularity in the construction of mankind, control cannot be designed that will fit exactly every man who may be called on to operate it. It should not conform to the tall man or to the short man, but should be adapted to the average. Control that is exactly suitable for a man 6 ft. 2 in. in height will be a poor arrangement for one of 5 ft. 5 in., and vice versa. But designed for the average man it will fit the great majority of drivers and may be efficiently operated by those at both ends of the scale.

The measurements of No. 1 truck indicate, on the whole, a good design. In this both drive and control are on the right side. The height of the seat, 18 in., is that to which the average man is accustomed, and is low enough to give freedom to the legs in the operation of pedals. There is sufficient space between the steering post and the seat, 18 in., to afford ample leg room, and at the same time the rake of the post brings the wheel to a comfortable position. It is long enough to afford room between the seat and the edge of the wheel, which is 18 ins. in diameter. The distance to the pedals, 15 ins., is fairly good with an 18-in. seat, although a shorter distance would be more desirable. Unfortunately the measurements of the levers were not obtained. It is here that the principal fault in the design lies. While of good length, they are too far from the seat and require too long a reach. This fault is not as glaring as it is in some other cases, but it is nevertheless open to criticism, particularly as it could be easily remedied.

No. 2 is an example of the right-side drive and center control. Its design is unusual, the driver's seat being on the right of the engine and there being a second seat on the left. The design might be open to criticism on account of the short distance between the steering post and the seat, 15.5 ins. A slight rake would give more leg room and bring the wheel in a better position. The distance between the wheel and seat, 14 ins., is more than ample. The distance to the pedals, ½ in. more than in No. 1, is fair, but would also be better if the pedals were a little further back. The length of the control levers, 22.5 ins., is decidedly commendable. Convenient location is a feature of the majority of designs embodying the center control. Here the length of the levers above the floor is 22½ ins., 4½ ins. higher than the seat, and their distances from the seat are 9½ and 9 ins. respectively. The driver does not need to stoop at all to reach them and the handles are immediately to the left of the wheel, accessible with the minimum motion. In a vehicle of this type the adverse criticism is that the seat is readily accessible from but one side, as it is necessary to climb over the hood to reach it from the left.

Good Arrangement for Light Delivery Car

No. 3 illustrates a very good arrangement for a light delivery car. It has left-side drive and control, and, having a planetary gearset and foot brakes only, is equipped with but one lever. The seat is the average height, 18 ins., and the steering post 24 ins. long, with distances from the seat at top and bottom of 12 and 19½ ins. respectively, indicating considerable rake and affording very good leg room. There is also ample space between the wheel and the seat. The wheel, 15.5 ins. in diameter, might well be 2 ins. larger, but in a light car will answer all purposes. The distance to the pedals, 19 ins., is very good. The position of the lever is also good, as it is 1 inch higher than the seat and 7 ins. from the top of the latter, convenient to the driver's hand. Its proximity to the seat also allows plenty of room for passage.

No. 5 shows an arrangement for a light car that is the direct opposite of No. 3. While the height of the seat, 16 ins., is that adopted by many pleasure car manufacturers as being most comfortable, and the length of the post and the distance between the seat and the wheel is good, the space between the post and the seat at top, 4 ins., and bottom, 4 ins., seems to indicate that the designer gave no consideration to the needs of the driver and that his object was to hinder rather than expedite the operation. This distance is but 4 ins. measured between the seat and the throttle and spark control rods at the rear of the post. In mounting to the seat it is manifestly impossible to get the foot through that space lengthwise, and many men could not do so sidewise. Moreover, the calf of the average man's leg will measure 4 ins. in diameter. It is evident that the driver must either worm around the wheel over the seat or throw his leg over it, either of which borders on the ridiculous in a vehicle of 1912 model. Quick egress from this car is impossible, and in the event of an accident the driver would be pinned down as securely as if he were tied. In addition to this fault, the distance to the pedals, 17 ins., is too long even with a 16-in. seat. This seems to be a common fault in control design. Too often the pedals are placed so that in order to operate them the driver must slide forward in the seat and extend his legs to their full length. It is impossible to exert any appreciable amount of force with the muscles extended, and as the driver is too far forward in the seat to brace against its back, and must get purchase by pulling against the wheel, this position throws the strain entirely on the arms, shoulders, and back. This not only hinders the control of the wheel, but also requires that the upper part of the body do the work that the legs should do. Holding a heavy truck on the road, operating levers, and performing many other operations necessary to a day's work is sufficiently tiring to the arms and shoulders, without loading them with more than their share of the burden. Pedals should be placed so that when they are pushed clear down the knee is slightly bent, and the driver may sit back in the seat, leaving the arms free to control the wheel and operate the levers.

Result of Badly Located Pedals

Some time ago there was an incident that forcibly illustrated the possible results of badly located pedals. The driver of a vehicle was running it along a country road with a thick hedge on the left. Suddenly, without any preliminary warning, another car came out of a road at his left when he was within 10 yds. of it. His action was prompt, and but for the poor control design of his car would have been equally effective. He threw himself forward with both feet on clutch and brake pedals. As the latter were too far forward he had to pull against the heel to obtain purchase on them. He then reached for the brake levers with his right hand. As he was pulling on the wheel to hold down the pedals, the instant that his hand left it the car swung around into the hedge.

It might be said that he should have released his pressure on the wheel before reaching for the lever. But the whole action was almost instantaneous, and anyone who has ever been in a like exigency knows that things happen too quickly to permit any complicated motion. Had he been able to utilize the back of the seat as a brace he could have handled the wheel without serious consequences.

The lever of No. 5 is of fair length, being 1 inch higher than the seat, and is close enough to it to be within easy reach and to allow passage. This and the height of the seat, 16 ins., are the only redeeming features of the model.

In No. 7 the seat, 21 ins., is much too high. In adapting chairs and other furniture of like character to human dimensions it has been found that a seat 18 ins. high is best fitted for the average person.

Room Between Wheel and Seat

No. 7's steering post is made proportionately long to allow room between the wheel and the seat. The latter slopes back from the foot-board and the post is straight. The distances at top and bottom are 10¾ and 7 ins. respectively. The latter is much too short. While the driver may lift his foot in passing the post, the design must be condemned on that score, as there is no apparent reason for it except a possible desire for originality.

The diameter of the wheel, 9.22 ins., is excellent for a heavy truck, giving a long leverage and making the vehicle easy to control. The control levers are of good length, but are both a little too far from the seat, necessitating a long reach and obstructing the passage. This condition is aggravated by the proximity of the steering post to the seat, 7 ins.

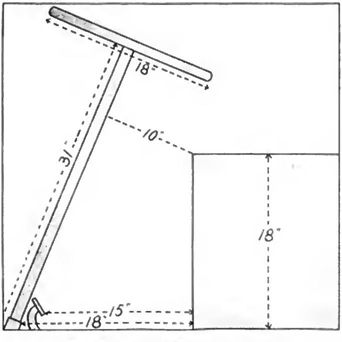
No. 6 is commendable throughout, with the exception of the position of the pedals and the brake lever. The pedals should be an inch nearer to the seat, and the latter is much too far forward, producing the same results as are shown in No. 7.

No. 8 is good as a whole, but is marred by the length and position of the control levers. They are too short, being 1 inch below the seat, while the position of the gear lever is good, that controlling the brake is so far forward that the operation of the latter will not be quick and effective, and passage to the seat is made difficult. The criticism might also be made that the post is a little too close to the seat, 7 ins. The distance to the pedals is a little too long, 16.5 ins.

Good Seat but Pedals Too Far Forward

While No. 9 has good points, it has others that go a great way towards counteracting them. The seat is of comfortable height, there is good clearance between it, and the steering post, and the wheel is large, but the pedals are too far forward by 3 or 4 ins. The length of the levers is good, but their position indicates but little thought of the important factors in driving. The gear lever is within easy reach when it is in neutral, but not when it is pushed forward. The brake lever is 24 ins. from the seat. To reach it the driver of average height must lean so far forward that his body presses against the wheel, a position from which it is impossible to maintain effective control of the latter or of the car. It is true that the hand brake is not often used, but when it is, it is needed badly, particularly on as heavy a truck as this one is. And while it requires but few seconds to operate it, they may be vital in preventing an accident. In the brake test during the contest held by the Chicago Motor Club last Fall the time lost in reaching for the lever was noticeable. In the case of vehicles having badly placed levers enough time was lost to make a difference of several feet in the distance required to stop, which, in a road emergency, might be the difference between safety and an accident. In the extra time spent leaning forward the vehicle will move several feet, and the delayed action of the brakes will cause more to be lost before it comes to a stop. The effect of a stooping position on the control of the wheel is of even greater importance.

No. 10 represents a design that possesses a mixture of good and bad features. The height of the seat and the distance to the steering post are good, but there is not quite enough room between the seat and the wheel. In this case a little less rake to the post might improve the design. The greatest faults are to be found in the length and position of the control levers. The former is 4½ ins. less than the height of the seat, and would not be convenient if the levers were close against it. The gear lever can be operated with a fair degree of comfort, but the brake lever is too far from the seat even if it were of adequate length.



Steering Gear Arrangement No. 1, Type 2

No. 11 shows a design the virtues of which are minimized by very poor location of levers, even worse than in No. 9. The seat is of good height and the post is fairly well placed, although it would be better for more rake and more space between it and the seat. The diameter of the wheel, 20 ins., is excellent for a heavy vehicle. The distance to the pedals is also good. But the levers are several inches too short and are very badly placed, and being 3½ ins. shorter than the height of the seat, any appreciable length in their distance from it would necessitate a stoop. The distances are 15 and 24 ins. respectively. To reach the brake lever the operator of average build must bend double, bringing his head on a level with the wheel, from which position it is impossible to keep a clear view of the road, much less to control the vehicle. No. 9 was cited as an example of badly placed levers, but they had the virtue of being 6½ ins. above the seat, while here they are below it, 8 ins. shorter than those of the other. It is designs like this that prejudice a driver who does much thinking against that particular make forever after.

Gear Lever Measurements Taken in Neutral

It may also be mentioned here that the measurements of the gear lever, in this and all other cases, were taken when it was in neutral. When it is pushed forward the reach will be several inches longer in all instances. Many manufacturers do not seem to realize fully the detrimental effects of poorly placed gear levers on the mechanism and operation of the truck. The average driver is prone to neglect whenever he can things that are hard to do. It follows that if the operation of the gear lever is difficult he will not change gears when he should, and will use one speed when, to secure the most power at the rear wheels and for the greatest good of the engine and transmission, he should use another. This is a greater factor in trucks than in pleasure vehicles. The truck has a heavy load to carry, and even when the power plant is more than ample, the direct drive should not replace the gears when conditions fit the latter. For instance, when a heavy truck meets with a particularly bad spot in an otherwise good road and is running on high speed to negotiate it, even if it is so short that the vehicle could be sent over it on momentum, it is bad practice to do so, as it places an unnecessary strain on the springs, motor, gearset and all other parts. If the control lever is unhandy and difficult to operate the average driver will not change his gears under such conditions, whereas if it involves no stooping and reaching he will usually do so. It might be reasoned that any particular truck was built to withstand such strains, but it is the little things that occur unnoticed every day that do the most to shorten the motor truck's life.

In No. 12 the seat, 19 ins., is a fraction too high and the length and position of the post are only fair. A longer post with a little rake to bring the wheel back a little and allow more leg room would be an improvement. The wheel is unusually large, 24 ins., giving excellent leverage. The distance to the pedals is good, but should be shorter with a 19-inch seat. The levers should be much longer, and while the gear lever is well placed, the brake lever is very much too far forward.

Good Seat, Steering Post and Leg Room

No. 13 shows a good seat and steering post and good leg room. The wheel is of good size, although as the vehicle is a heavy fire wagon it might well be larger. The pedals would also be better for being an inch nearer to the seat. The levers should be much longer, and that controlling the gears is too far from the seat. The brake lever in this instance is exceptionally well placed, being 8 ins. from the seat

No. 14 could be improved by placing the post farther forward, and the brake lever has the common fault of being too far from the seat, requiring a long reach and interfering with passage in and out of the cab. Otherwise it is very good. The seat is low, as preferred by many drivers, the pedals are well placed, and the wheel is of ample dimensions.

Important Points of Remaining Designs

To consider briefly the points of the remaining designs, the post of No. 15 is a little too close to the seat, being 8¼ ins. No. 16's post is too close to the seat for comfort, 9¼ ins. It should also be longer, leaving more space between the seat and the wheel. The pedals are well placed, but the levers are too short and too far forward. The same fault in the height of the seat appears in No. 17, a fire wagon, but the distance between the latter and the post is much better. The wheel has good dimensions and the pedals are well placed. While the length of the levers is insufficient their location is excellent, as they are close to the driver's hand.

No. 18 shows a good design as to seat and steering post, but poor as to pedals and levers. The former should be at least 2 ins. closer to the seat, and the latter would be improved by several inches additional in length, and are too far forward.

No. 19's seat is too high and the location of the post would be beter if it were further forward and set at an angle, giving more leg room and bringing the wheel in a better position. The pedals are too far forward for a 20-inch seat and the levers are very much too short, although their location is excellent.

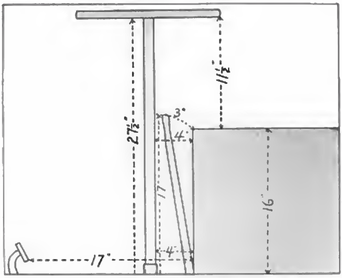
No. 20, also a fire wagon, shows another high seat, 21½ ins., worse in this respect than any other mentioned. Its post, however, is very well placed, with the exception that the wheel is a little too close to the seat, a defect that could be easily remedied by reducing the rake of the post. Aside from the height of the seat the worst feature of the design is the levers, which are too short. The gear lever is well placed, but the brake is too far forward.

Left Side Drive and Center Control

No. 21 illustrates an example of left-side drive and center control. Its seat is low and comfortable, but the post is too close to it and the pedals are too far forward, even with a low seat. The length of the levers is excellent, and considering the other dimensions of the design, are well placed. Ordinarily it would be said that the brake lever is too far forward. But with the low seat, the disadvantage of the distance is overcome by the lever's height above it, which eliminates the necessity to stoop and reach. As the control is centrally located it is necessary to place it far enough forward to afford room for its operation without interference from the seat.

All of the six remaining designs have seats of good height. No. 22 would be better for more room between the seat and the steering post, and No. 23 for more between the seat and the wheel with less rake to the column. The wheels are good in both instances, but the pedals of the former are too far forward. The length of the levers in both is good, but the brake levers in each case are placed in a too far forward position.

In No. 24 the steering post is much too close to the seat and could be improved by considerably more rake. The same fault appears to even a greater extent in No. 25, which is another example of the left-side drive and center control. The wheel is of sufficient diameter for a light car, but the pedals are too far forward, and the lever, governing a planetary gearset, should be closer to the seat, as its movement is forward, eliminating any necessity for room between it and the seat. This is to be condemned the more as it could be easily remedied by a bend in the lever.



Steering Gear Arrangement No. 5

No. 26 shows an otherwise excellent design that is marred by badly placed pedals. The seat is good, there is ample leg room, and the levers are well placed. If the pedals were 2 or 3 inches nearer to the seat very little fault could be found with the design as a whole.

No. 27 merits special consideration, as it represents a left-hand drive with a divided control, the gear lever being in the center and the brake lever at the left. With the exception of the latter's location the design is good. In order to afford passage to the seat it is set forward, making the reach too long.

It is evident that the most common faults in control design are to be found in the location of the pedals, and in the length and location of the levers. The tendency is to place both too far from the seat, and to make the levers too short. It is also evident that the location of both pedals and levers is governed largely by the height of the seat. When the seat is low the pedals may be at a greater distance from it than when it is high. There is a maximum limit, however, to the distance, as there is a limit to the height of the seat.

Levers should be several inches higher than the seat, as the additional height brings them closer to the driver's hand. This is of equal importance with the height of the seat, as short levers always require a stoop, whatever their particular location may be.

Deserves More Thought Than Is Accorded It

Poor control design is clearly an evidence of lack of consideration on the part of those responsible, as it is very seldom that there is any good reason for badly placed control devices. As stated in the beginning, the question is one that deserves more thought than is often accorded to it, and while finality is probably some years away, the future will undoubtedly witness as great improvements in that part of the truck as the last two years have shown in its general design.

It is beginning to be understood clearly that the truck's efficiency depends largely on the caliber of the man who operates it, as is indicated by the fact that light cars that will be driven by men with small mechanical knowledge are equipped with transmissions that are simple in design and as near fool-proof as it is possible to make them. This evidence of realization on the part of the manufacturer makes neglect of the control seem all the more unreasonable. The prospective user of the motor truck should be as critical in this regard as he has come to be regarding the motor, transmission, spring suspension, and frame because such criticisms will bring about the needed reforms.

A Device for Quick Loading

A COUPLE of interesting devices for quick loading of goods were noted recently.

The first was in use by a certain fruit firm in a Western city for bananas especially. This device was in the form of a round chute as in Fig. 1, the device being so constructed that the bananas in their cases could be shot from the second floor to the basement or onto the sidewalk.

The chute was formed of a number of iron rings about 18 inches in diameter, inside of which were fastened six or eight wood strips, about 3 inches wide, running lengthwise and screwed to the iron rings. This made a slatted wooden pipe, which was made up in shape to bend out of a second-story window, swing to the right at an angle, as in the drawing, and when some 5 feet from the walk, turn directly down, entering a hole in the walk leading to the basement.

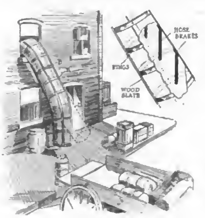


Fig. 1

The lower 5 feet of section just above the sidewalk was removable by sliding back some ordinary door bolts, and, by taking this section out and covering the hole beneath, the crates from above could be shot directly to the pavement.

To prevent breakages there were a number of strips of heavy rubber hose, fastened to the upper side of the wooden tube and hanging down into it; these acted as a brake.

The device is thoroughly satisfactory for its work and needs almost no attention. By a little adaptation a scheme of this kind could be used for many different kinds of delivery, even to package loading from a second story through the roof of a covered truck for department store work. There are endless possibilities for similarly constructed loading devices.. the waiting wagons about 30 feet distant across the curb. This chute is used but a few hours each day and when not in use is folded up against the wall.

Radiator Guards for a Fuel Company

A city fuel company is fitting radiator guards to its fleet of twenty-five Saurer trucks. These are home-made affairs and while not especially attractive in appearance are strong and serviceable and might well be refined to fit almost any truck, and at the same time look well. The constructional details are shown in the accompanying illustration.

The main part is, of course, the guard C made up of 1-inch round iron, bowed to follow roughly the outline of the radiator and with a 3-4-inch cross-bar welded across in the position shown. The lower end of the frame thus made has the tips flattened out to form side pieces fitting alongside the frame of the car just in front of the radiator. These flattened portions are drilled and a clamp, as in the smaller drawing, is fitted to fasten these lower ends tightly to the frame just back of the front spring horn.

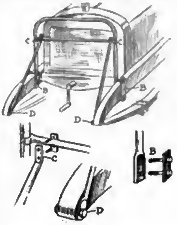


Fig. 3

This frame is further held by a brace running up from one side, clamped to the cross-bar at C, as shown, and to the end of the front spring bolt at D. The guard would be much more symmetrical if such a brace were fitted to both sides.

For traffic work a truck needs protection for the radiator, and in this form of guard the city fuel company has a simple and effective appliance, though the cost of making by hand may be considerable. The radiator is a frail part of the mechanism of a motor truck, and by its position is rendered most liable to accident in congested districts. It is in rectifying such small defects that the full value of a truck is gained

A Mail Chute Scheme

A printing and mailing house in the West is using a chute scheme for delivering mail down a stairway from the second story. In this case the chute is made up of wide boards with a vertical strip at each side as an edge. The chute covers half of the exit stairway when in use, the mail bags, being thrown into it, sliding down the distance of some thirty steps to the main floor entrance of the plant. From here the mail is carried by hand to

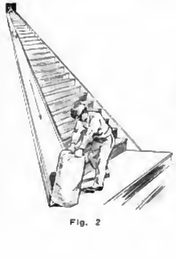


Fig. 2

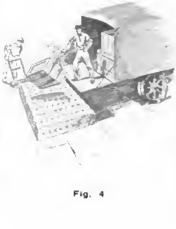


Fig. 4

Unloading Mattress

A truck belonging to a big city department store, used for the parcel branch of the delivery, backs up at a garage entrance, there being no platform to unload to. To carefully lift the heavy trunks down from the truck body to the ground would take too much time, and to drop them off the tailboard of the truck would damage them, steel though they are. A stout mattress is therefore provided, which is ready in place as soon as the motor truck is backed into position, a delivery boy at the garage having charge of it. This thick mattress is placed directly under the tailboard, where the driver can drop the trunks off as roughly as he may wish, only taking care that they drop onto the cushion provided (See Fig. 4).

From there they are hauled off and wheeled into the garage by hand trucks.

A New Federal Grip

The Federal Chain & Manufacturing Co., Springfield, Mass., has added the "Federal" grip to their regular line. These grips are made in units consisting of two steel cross-members integrally connected by two side arms, as shown in Fig. 5. These are secured at the four corners by adjustable connecting chains to other similar units constituting the complete grip. It will be seen, therefore, that each gripping unit forms a solid structure, the cross-members of which cannot stir from their fixed position, and remain at all times radially with the wheel. It will be noticed also that the solid double-grip units are flexibly connected by chains and the contact of one of them with the ground does not lift the others from the tire, as with a rigid structure; thus the driving strain is equally distributed around the entire circumference of the wheel.

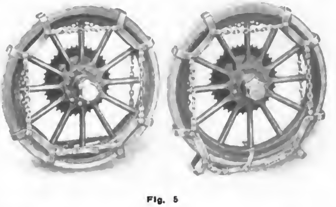


Fig. 5

"Federal" grips are so constructed that the gripping portion which crosses the face of the tire is double the thickness of the steel side arms, thus giving an effective driving medium and at the same time avoiding unnecessary weight and thickness on the sides of the wheel. This is an important detail when the grips are used on vehicles which have driving chains running in close proximity to the rims. The under surface of all cross-members are rounded where they come in contact with the tire. "Federal" grips can be attached to the wheel in 2 minutes. It is only necessary to place them evenly on the wheel, as shown in Fig. 5, then bring the free ends together at the bottom and engage the lever fasteners on each side, and they are ready for use, as shown in illustration. Fig. 8 shows end-view construction detail.

A Testing Hydrometer

The accompanying illustrations show the type of hydrometer that is generally used to test the state of charge of electric vehicle batteries. The hydrometer is shown floating in the positions indicating respectively "battery charged" and "battery discharged."

If the gravity reading of the battery when fully charged is 1280 and when practically empty 1180, then 100 divisions of the hydrometer will represent the total capacity of the battery. If the capacity of the battery is, for example, 10 kilowatt-hours, then fifty divisions will represent 5 kilowatt-hours, and twenty-five divisions 2.5 kilowatt-hours. When, therefore, the hydrometer reads, for example, twenty-five divisions above its lowest reading it will indicate that the battery is three-quarters empty and that 7.5 kilowatt-hours will be required to complete the charge. Such a hydrometer should be part of the equipment of every electric vehicle.

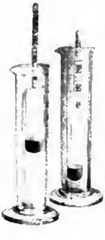


Fig. 6

Sectional Truck Tire

The Victor sectional truck tire, a cut of which is reproduced, Fig. 7, is one of the new block tires that is attracting the attention of heavy duty truck users. This tire is being manufactured by the Victor Rubber Co., Springfield, O. It is made of sections or blocks, each of which is secured in a steel channel which is shrunk on the wheel, and the blocks are held in place by locking bars. This fastening device is a high test carbon steel rod 5/16 of an inch in diameter, vulcanized in the blocks and projecting ¼ of an inch at either end. The projecting rods are inserted in sockets in the locking bar, so that when the bar is drawn down there is a constant pressure on the rods, holding the blocks securely until they are worn out.

The locking bars are bolted to the channel and have walls in the center which prevent any endwise movement of the rods. These bars and the side of the channel form a cup into which each block fits securely.

The simplicity of the fastening permits the removal of a block in a few minutes, without disturbing any of the other blocks composing the tire.

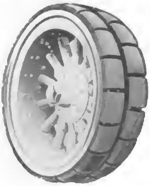


Fig. 7

Hauling by Motor Truck

A power company's truck was seen recently hauling fourteen men to a construction job and towing a reel of cable behind on separate wheels.

The truck was a 2-ton electric and carried a load of construction material in addition to the workmen. It is unusual to see a motor truck towing anything in the larger cities, but this machine has become a more or less common sight in the city where it is operating. The cable is hauled so that it can be handled easier on the job, and the cable reel being fixed on wheels to be moved about by the men while the work is in progress.

Another case of towing by motor truck was also noted. A 2-ton truck for an oil company towed out from town, at an aerial meet, a standard two-horse tank wagon with gasoline for the contestants while the truck was loaded with barrels of oil.

The distance to the clearing field to which the tank wagon was towed is about 9 miles, with good roads for all but the last mile.

Starting back at night the tank wagon imbedded its wheels in the mud alongside the course and the truck had a hard time pulling it out. It was at last extricated by the judicious use of planks and cinders. The truck was but a two-cylinder machine of small horsepower.

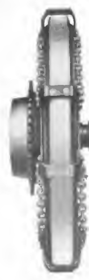


Fig. 8

Horsepower and Gear Ratio in Trucks

Conclusion of E. P. Batzell's Paper—Significance of the Motor Torque Drop —Deduction as to Fuel Economy—Method of Selecting a Commercial Vehicle Motor

Part V

THIS paper was read before the Society of Automobile Engineers, at Detroit, and the first instalment was published in the August issue of THE COMMERCIAL VEHICLE. *In this interesting paper the use of smaller motors in the commercial vehicle was urged, and recommendations were made for drive ratio between the motor and the rear wheels.*

TYPES were given of motors used for frequent high or low speed work, and examples of motor power and torque curves were reproduced. In last month's instalment the effect of throttle opening on motor torque, thermal efficiency and fuel consumption curves was shown, together with fuel consumption variations in the Thomas and Franklin engines.

THE rapidity of the motor torque drop indicates the rate of power development; as when the torque falls quickly in value, the power curve shows a sharp declination from the initial straight direction. This means that the motor receives a smaller and rapidly decreasing amount of fresh charges, and works with a lower mean effective pressure than at the lower revolutions per minute. In other words, the motor becomes more strangled in valves and gas passages, which most frequently is accompanied by reduced mechanical efficiency. At any rate this indicates one method of getting a rapid torque drop, should this be desired, namely, by using such features in the motor construction as would exert a strong choking effect upon the gases even at medium speed, such as small valves, narrow passages, etc. The expected result would be obtained, as far as torque decrease is concerned, but the fuel consumption would by no means be low. Any such alteration introduced into the motor construction, contrary to the general practice with highly efficient types, would in its results be equivalent to strangling the gases in the carbureter by partially closing the throtttle, as was mentioned before. The motor torque and fuel economy would be affected equally in either case, but the use of the carbureter throttle carries with it a great advantage, inasmuch as it permits the developent of a greater torque with better fuel consumption in all those instances when the motor load warrants its running with throttle wide open. Consequently the motor construction need not differ from that which gives the best economy under full load, and still the throttle regulation reducing the torque when necessary would remain as a possible recourse to give the desired value to the speed-change factor f of former examples, thus bringing the number of speed ratios down to the best desired in practice. The combination of a greater number of speed ratios than usual at present, together with a small range of speed regulation by changing the throttle opening, would give the best results in economical operation of commercial car motors and proper selection of their sizes.

THIS concludes discussion in regard to items influencing economy of motor functioning from standpoint of least fuel consumption. The results and figures deduced seem to prove that it is doubtless most profitable to use in a commercial car the smallest motor, the developed torque of which at the most economical revolution per minute, with a suitable ratio in the drive, is sufficient to propel the vehicle. The motor size thus can be determined from different working conditions, assuming any of the prospective load and tractive resisistance as basic in the figuring. The motor should be small enough to render reliable service when the run of the empty vehicle covers good level roads and the desired speed is obtained with the highest ratio in the drive, whereby the motor itself remains within the prescribed economical limits of speed and throttle-opening. On the other hand, this same motor must be sufficiently strong to propel the loaded vehicle under average road conditions as expected in service and maintain the speed found the most advantageous. If these conditions are the ones most frequently to be encountered, then at the same time the motor should work with throttle full-open and also within its set speed limits, although the drive ratio might be different from the one used for the empty runs, this being determined principally in accordance with the desired vehicle speed and the revolutions per minute of the motor. Any increase above a certain limit of the tractive resistance, due to changes in the load, the road, etc., will be taken care of by introducing a greater ratio in the drive, retaining the economical motor speed and torque. The greatest ratio necessary ought to be sufficient to make the vehicle negotiate at a given slow speed the worst kind of roads to be met in service upon grades and with a considerable load. As stated before, the condition to be considered in determining the lowest speed ratio in the drive and the motor power in connection therewith should include the cost of the service versus time required to perform it with the respective motors and drive ratios.

Regardless of the method followed in establishing the motor size, the smallest one would obviously be the most economical from many other points of view than that of fuel consumption. The smaller motor uses less lubricating oil, is less expensive in initial cost, its repairs are likely to be handled more easily and cheaply, it allows reduction of the vehicle size and weight (together with a number of advantages connected therewith), some of the other vehicle parts can be decreased in size, etc. The smaller and lighter motor permits either reducing the overall dimensions of the vehicle for a given carrying capacity, or leaving more available room in the same space, and greatly increases ease of arranging the whole vehicle construction, especially in the generally crowded space occupied by the power plant.

TO illustrate the suggested method of selecting the mo for a commercial car, an example with figures will be given. The vehicle is a truck of 3 tons carrying capacity an weighing empty 3 tons. The tractive resistance when th passes empty over a level asphalt road can be assumed pounds per ton of weight propelled; total, 60 pounds. iving-wheels of the truck have a diameter of 36 inches; quently their combined driving torque is 60 × 18 = pounds-inches. For a given type of vehicle the mechaniiciency in the drive between motor and the wheels is to per cent. The highest speed ratio in this drive would be by comparing the desired vehicle speed at this moment the motor revolutions per minute corresponding to the limit set by its fuel consumption requirements with rottle partially closed. In regard to the choice of the r revolutions per minute for economy they should be bly low, because the minimum of fuel consumption with tain rate of throttle closing is reached at a lower revoluper minute than when the throttle is fully open, due to ons explained before. Therefore, it is well to not exceed evolutions per minute of the open-throttle minimum, pararly during extended light runs. But when the service es provision that such runs happen only occasionally and a short time, higher motor revolutions per minute may be cted, followed by either higher vehicle speed or a reduced o in the drive. The latter is very desirable as it brings ratio closed to the ratio used for average running condis, thus reducing the number of gear changes required. In present example the motor speed with truck empty is to 1,000 revolutions per minute and the corresponding vehicle ed 15 miles per hour, when the driving-wheels make $\frac{\times 5{,}280 \times 12}{0 \times \pi \times 36} = 140$ revolutions per minute, overlooking the ssibility of their slipping. This determines the highest tio between motor and wheels at $\frac{1{,}000}{140} = 7.14$, which in its rn determines the required motor torque, with consideraon of the drive mechanism efficiency, as $T \frac{1{,}080}{7.14 \times .65} = 234$ ounds-inches. Suppose that the limiting rate of throttle closg is set by the requirement that at the maximum speed of ,000 revolutions per minute the motor torque with partially pen throttle shall not be smaller than 50 per cent. of the orque at the same speed, but with full-open throttle. Thus vill be found the desirable motor power during the latter time, namely, $\frac{468 \times 2\pi \times 1{,}000}{12 \times 33{,}000} = 7.5$ horsepower, whereas only 3¾ horsepower are necessary for propelling the empty vehicle under the assumed conditions. These power figures are, of course, much smaller than those of customary motor ratings. The determined developed torque capacity of the prospective motor should be checked as to the power and speed requirements for average service conditions comprising the most frequent runs with usual loads. The 3-ton truck should carry a load equal to its rating, the road conditions being such as to cause a tractive resistance on the level of 40 pounds per ton of weight. This brings the total driving effort on the rear wheels up to 240 pounds and their torque to 4,320 pound-inches. The motor speed should not exceed 800 revolutions per minute when its developed torque might be somewhat greater than that at 1,000 revolutions per minute with wide open throttle. The rate of this increase can vary, but in motors well built for the object of economy it ought to be slight, in the neighborhood of 10 per cent., making the motor torque equal 520 pound-inches instead of 468 pound-inches. With the stated drive efficiency of 65 per cent. one finds the new drive ratio $\frac{4{,}320}{520 \times .65} = 12.8$, and the corresponding vehicle speed reaching 6¾ miles per hour. This speed ought not to prove too low in instances when a full load is carried for the sake of sparing the truck mechanism, but should the load become smaller the motor-speed could be raised to 1,000 revolutions per minute, giving the vehicle a speed of 8½ miles per hour with the same drive ratio. When the service conditions require greater promptness than found above, a more powerful motor must be used. For instance, a speed of 10 miles per hour should be maintained with a full load upon the previously assumed kind of road, which gives a drive ratio of 8.6, with the motor running at 800 revolutions per minute. The motor torque to be developed here is $\frac{4{,}320}{.65 \times 8.6} = 775$ pound-inches, resulting in a power output of $\frac{775 \times 2\pi \times 800}{12 \times 33{,}000} = 9.8$ horsepower as against 6.6 horsepower consumed at 6¾ miles per hour with a ratio of 12.8. Even the larger figure of required motor power is considerably smaller than would be expected in judging from present practice in motor sizes. The motor bore and stroke dimensions, in the example taken, as well as in other cases when the required power is given, can be determined by several different manipulations, depending on personal preference. Thus any of the established power rating formulæ would give the sizes, but the disadvantage of this method lies in the fact that rating formulæ are generally based on pleasure car practice and are of little use in connection with commercial cars, inasmuch as they do not take into account the influence of motor compression. It is more proper to use for quick reference tables or charts showing the motor power in accordance with bore, stroke and compression, or mean effective cylinder pressure.

SHOULD the smaller motor with 520-pound-inch torque at 800 revolutions per minute be sufficient for the service, its dimensions are, retaining $P = 50$ pounds per square inch, $D = 3$ inches and $S = 4\frac{1}{2}$ inches. Either of the motor sizes must be checked also as to being ample for the most severe conditions to be encountered during the service before they may be definitely accepted. Equal traction conditions should be assumed for both motors, which will give a good comparison between them in regard to some points. Suppose that the worst traction conditions are met when the vehicle is ascending a grade of 10 per cent. with a tractive resistance upon the ground five times greater than that assumed for the easiest conditions. This would require a driving effort on the wheels of 1,200 pounds to overcome the grade and 600 pounds for the ground resistance, resulting in a total torque at the wheels equalling 18 × 1,800 = 32,400 pound-inches, or thirty times as much as during the easiest run. The drive ratio between motor and wheels, being determined from the respective torques, ought to be as much greater here as in the latter, if the motors are supposed to work under the same conditions in both cases. However, when the vehicle is heavily loaded, as at present assumed, the motor should work with full-open throttle and eventually at a slower revolution per minute than in light runs, which would increase accordingly its torque and consequently decrease the drive ratio. Suppose that the motors function with the same throttle opening and at the same speed as during the above-mentioned average state of service conditions, when their torques were determined at 520 pound-inches and 775 pound-inches, respectively. Taking the drive efficiency in this case equal to 60 per cent., the drive ratios would figure out as 104 for the smaller motor and 70 for the larger one. The vehicle speed would be .86 miles per hour with the former and 1.24 miles per hour with the other. Undoubtedly the first figure would be considered as extremely low and unprofitable for the bulk of practical commercial car service. Similarly, the larger motor size also might not be economically adequate in some instances where great promptness is required, notwithstanding bad roads and grades, although for common cases in level city and suburban work it ought to be sufficient. Comparing the amount of time necessary for ascending grades using the different motors, with the general economy following the installation of the smaller type, one could obtain a certain resulting figure, the waste of time being equivalent to an expense. When more time is required to perform a certain service the owner is forced to either install a greater number of cars for his needs or extend the service over longer daily working hours. Of course, less time is necessary for a given run when larger motors are used. On the other hand, the larger motors, as mentioned, involve a greater initial expense, work with less economy during light runs, when they have to be strongly throttled, etc. To solve the question properly comparisons should be made for not only the most severe conditions, but for all conditions which enter into the selection of motor size. The rest of the vehicle parts may or may not be taken into account in the calculations, depending on importance; the transmission at least warranting some attention being paid to it.

RETURNING to the two motor sizes in the former example and to the ratios required for different conditions of work, one notices that the smaller motor has a lowest speed ratio of 104, which is about fifteen times greater than the highest one used during the easiest runs. With the larger motor the lowest ratio is only about ten times greater than the highest, the same maximum vehicle speed being attained in both cases. That would require a greater rate of throttling of the larger motor under light load than was figured at the start, but as the larger motor size is supposed to be the economically selected one only when the service conditions are more difficult on an average, this additional rate of throttling ought not to have any influence of consequence upon the total economy. In the example taken the maximum motor torque would be about 2.2 times greater than the minimum with partially closed throttle, referring to the 3-inch x 4½-inch motor. Whereas it is sufficient to have a four-speed transmission with the larger motor, a four-speed one used in connection with the smaller could not give the desired flexibility and economy.

PROPER ratios to be incorporated in transmission are: 7½ to 1, 15 to 1, 32 to 1 and 70 to 1 for the 3½-inch by 5¼-inch, and 7 to 1, 16 to 1, 40 to 1 and 104 to 1 for the 3-inch by 4½-inch, when it is essential to have not more than four speeds in the gearbox. The ratios shown in connection with the larger motor have a further advantage in that the direct drive can be also the highest ratio, the 7½ to 1, if it would be the one most frequently used. Referring to the load and ratios hereinbefore calculated the motor would be controlled only through the throttle when the conditions of the runs change from the easiest to the average as assumed because the respective ratios determined are 7 and 8.6, which are close enough to be united into one, for example, 7½ to 1. This fact ought to reject possible arguments as to difficulty and complication of vehicle operation with the motor as small as 3½ inches by 5¼ inches for a 3-ton truck. This is further proven by the fact that this motor size is very nearly the same as is used in the 3-ton capacity Alco truck, the size of which, 3 15-16 inches by 4¾ inches, has a piston displacement of 232 cubic inches, which is only 10 per cent. more than that calculated here.

In regard to the use of the smaller motor in a 3-ton truck one can say that it is followed by some inconveniences in the operation of the vehicle. The direct drive would probably have to be on second speed, corresponding to the most often and extended running under average load. The motor would have to be throttled more than set by the requirements assumed if proper functioning is to be obtained with a four-speed transmission. Thus a part of the gain from the small size of the motor would be lost. Moreover, taking into account the time required for a certain run, it would appear in general that reduction of motor size to 3 inches by 4½ inches can be justified in specially favored cases only where the tractive resistances remain small, as, for instance, when a number of trucks are to do continuous hauling within well-paved limits with easy grades. The requirement that this hauling is to be continuous is added for the reason that occasional hauling of that kind might be well taken care of by using trucks with larger motors which would otherwise be employed upon more difficult runs. Even if the service permits the constant use of one or two special low-powered trucks, but other higher-powered types have to be used by the same enterprise for more difficult work, it would pay to lose something on the cost of hauling for the sake of preserving uniformity of vehicles owned, the advantage of which becomes apparent in the general handling, repairing, overhauling, etc., of the whole service installation. In short, when selecting motor size, which is to be the most economical as well, there are to be considered a number of things. Thus in the example given above, although the first impression obtained from conditions expected during the easiest runs, made the propriety of the 3-inch by 4½-inch motor apparent, the general advantage obtainable with the 3½-inch by 5¼-inch motor during the remainder of the service and from consideration of the vehicle handling, force the selection of the latter type.

AS between the larger calculated motor size and the smallest one in actual use for the same service it seems correct to say that the smallest motor size thus far proven satisfactory in the case of any of the trucks of different carrying capacities, ought not to be exceeded in any vehicle of the same type. Thus far not much attention has been paid to the requirements of individual service conditions and motors large enough for any emergency have generally been selected. The smallest of these motors which has withstood well the test of such emergencies ought to have sufficient power for all cases, with but very few exceptions. The other side of the question lies with the transmission and the ratios employed in the drive.

At present many commercial cars are equipped with too powerful motors and with only two forward speeds. Reconsidering the statements of this paper for a case of a two-speed gearset one would find that here the motor must be more powerful than where a greater number of speeds are used because it has to have ample torque when the tractive resistance does not warrant the use of the low gear, but is greater than the average encountered. The single reduction in the drive necessarily being low enough to overcome the greatest expected resistance, and present practice seldom making it more than 30 to 1, or more than twice higher than the lowest ratio figured in the above example, in equally extreme conditions the two-speed transmission requires more than twice the developed motor torque of the four-speed one with a proper lowest rato, determined in accordance with the description given above. Such an oversize motor would actually perform the service required, but without any consideration of desired economy. In many instances the motion of the vehicle would occur with a tractive resistance by far smaller than that which the motor can overcome with full-open throttle; consequently the frequency and duration of its runs with partially closed throttle increase.

An observation of such trucks in actual service conditions would make this plain because there is hardly a chance of seeing them running with wide-open throttle, which indicates that the motor is not loaded to economical capacity. On the other hand, the road resistance might become too great to be taken care of by the direct-drive ratio of the car, with open throttle, necessitating the use of the low gear. This ratio might be so low that a very small throttle opening would suffice to develop the required power. Moreover, the speed of the vehicle would be reduced correspondingly, bringing the vehicle down to 4 to 5 miles per hour, or even less, whereas a much greater promptness could be maintained with the intermediate ratio of a three- or four-speed transmission. The two-speed gearset involves extra expense, such as for fuel consumed, time wasted by slowing down below the speed corresponding to the actual requirements of the road conditions, large motor with interconnected inconveniences, etc., all for the sake of gaining a trifling simplification in the transmission construction.

IT is to be noticed that the foregoing discussion deals with the question of required most economical motor size without consideration of the power consumed when accelerating the vehicle. It would be entirely wrong to base judgment as to essential motor size on an assumed rapidity and ease of get-away. A buyer can be influenced easily by a demonstration when a loaded truck is starting under way from standstill with second or high gear in mesh, although in reality ability to do this indicates merely uneconomical action during average service conditions. Starting, as well as the propelling of a vehicle, imposes certain requirements on the motor torque, not its power. The favorable shape of a motor torque curve has been explained, dropping gradually from the lowest revolution per minute on. This gives a double advantage in starting the car with the motor running comparatively slowly. On the other hand, it is often profitable to use flywheel inertia to assist in making the start or overcoming some other increased resistance of short duration. A torque curve having a rise at its beginning makes starting somewhat easier than the gradually dropping one because it is apt to give greater torque values in a certain range of revolution per minute after its maximum. Combination of the torques and flywheel inertia in connection with a slipping clutch gives a quicker start, with the faster running motor with the greater torque, but, as stated above, the rising and subsequently dropping torque curve shape is not favorable to economy and the distribution of drive ratios.

Quick acceleration in congested traffic is more important in a pleasure than in a commercial car; it causes some overwork of the motor and adds severe requirements of efficiency of the general brake system, which ought to cause a stop at least as quick as the time of acceleration; otherwise a heavy vehicle with a great momentum gained by acceleration brings very undesirable conditions into traffic. It is proper to run a heavy truck with low gear in mesh in a tight place, when a comparatively small motor will develop sufficient torque and power to keep the vehicle within reasonable limits of acceleration without disturbing the general traffic order. At any rate, the question of acceleration can be introduced as an item of some importance into the selection of the proper motor size only in those circumstances when frequent stops and starts are anticipated during service. In all other cases it would prove of too little advantage to gain time by a rapid start with a larger motor in the car, as against the lack of economy due to running continuously under a small percentage of its power development capability. The possibility of frequent starts being practically excluded in the service of trucks of large carrying capacity one can omit entirely any consideration of power required for acceleration when determining their motor sizes. On the contrary, motors for delivery wagons, passenger buses, etc., and other kinds of commercial vehicles having frequent stops should be selected so as to assure reasonable promptness during starts, which means using larger motors comparatively.

RETURNING to the motor size finally indicated as the result of the example figured hereinbefore for a 3-ton truck, its dimensions, 3½ inches by 5¼ inches, seem much too small, particularly when comparing them with those of present practice. However, one is more accustomed to the latter, although they have been adopted without investigating actual normal and extreme requirements. As stated before, it has appeared safe to use an oversize motor in a truck; thus one did away with possible future criticism as to lack of power. With increasing attention being paid to economical performance in servce, which ought to influence the scope and extension of commercial car application, the matter of properly selecting motor sizes according to service conditions rises in importance. It can cause not only a general revision of truck motor sizes, but introduce a greater variety of motor sizes for cars of the same capacity, of the same make, whereby different motors will be selected in accordance with prospective service. Thus one may become gradually educated to the fact that the use of a four-cycle, four-cylinder, 4¾-inch by 6-inch motor in a 3-ton truck regardless of the prospective service means at the least a serious disregard of economy. A buyer of commercial cars will do well to look into this side of the question to assure himself that the extra expense connected with the oversize motor remain within allowable limits. The proper solution of the question requires considerable experience and ability. Nevertheless introducing principles of scientific management into the matter of purchasing commercial cars is justified, not restricting their application to the organization and management. In this connection it may be mentioned that although this article deals with the question of motor size only, a similar investigation could be made of the other parts and constructive features of the vehicle.

IT is interesting to consider in what cases motors of present large sizes can be worked to their rated capacity economically, taking, for example, a 4¾-inch by 6-inch motor in a 3-ton truck. This motor has a piston displacement of about twice that of a 3½-inch by 5¼-inch motor, and ought to be treated as capable of delivering twice the torque of the latter under otherwise equal conditions, including piston speed. It can propel the loaded vehicle over a level road of 40 pounds per ton tractive resistance at a speed of 17.5 miles per hour; up a 10 per cent. grade with 100 pounds per ton resistance at a speed of 2.25 miles per hour; and the empty vehicle at 26.5 miles per hour. With the same lowest gear ratio as with the small motor this larger one can take the fully loaded car up a grade of 20 per cent., 114 degrees incline, with a tractive resistance of 200 pounds per ton, which corresponds to a soft muddy road surface. There is no doubt that conditions might be met in practice when reliable service could be rendered only with a motor not smaller than this, but that does not justify its use in all cases. As to the methods by which the proper motor size can be determined, one can say that attention should first be paid to the developed motor torque and its elapsing through a wide speed range, leaving the motor power to play a secondary rôle. It is the required motor torque and not the required power which determines the economical motor size for a commercial vehicle, as well as the suitable drive ratios.

Unique among the varied uses the motor vehicle has been put to is the work L. S. Davidson, of Portland, Ore., has been doing with his 1-ton Little Giant truck. Equipped with a complete motion-picture outfit, the power wagon was piloted out of the city recently to visit towns where electric lights are not used. With the power from the gasoline motor, a 110-volt dynamo generated enough electricity to run the moving picture outfit and one arc light. His equipment weighs 1,500 lbs. and the truck is rated at 25 horsepower.

TRADE AND PERSONAL MISCELLANY

H. A. FARR has been appointed manager of the Seattle branch of the U. S. Tire Co., Tacoma, Wash., and C. H. Mayer has been promoted to the managership of the Portland, Ore., branch.

George L. Sullivan has been appointed manager of the Chicago branch of the American Locomotive Co., succeeding B. C. Day, resigned.

L. A. Austin, sales and advertising manager of the Rutenber Motor Co., Marion, Ind., has resigned to take the position of general manager of the Mais Motor Truck Co.

Allen Baker, St. Louis, Mo., has concluded arrangements with the Dayton Auto Truck Co., Dayton, O., for the sale of Durable Dayton trucks in St. Louis and surrounding territory.

S. W. Barrett has been put in charge of the stock department of the E. V. Stratton Co., Albany, N. Y., distributors for Flanders trucks. He was formerly with the Packard dealers.

Harry R. Fletcher, for the past 3 years eastern New York representative of the Pruden Hardware Co., has become connected with the E. V. Stratton Co., as sales manager of Flanders trucks.

E. V. Stratton Co., Albany, N. Y., has opened a repair and service building at 391 Hudson avenue, for the care of Flanders trucks. A general repair shop for all makes of vehicles will also be conducted. Ezra Mickel will be in charge.

H. L. Winter, sales manager of the Universal Motor Truck Co., Detroit, Mich., has been visiting the various branches of Boston, New Haven, Philadelphia and New York, lining up the branches for their new 1-ton worm drive and for future business.

Papers have been filed with the Secretary of State increasing the capital stock of the Knight Tire & Rubber Co., of Canton, O., from $500,000 to $1,500,000. The increased capital is for the purpose of making large extensions and improvements at the plant.

The Motz Tire & Rubber Co. has been compelled to open a direct Boston branch for the sale of Motz cushion tires on account of the greatly increased demand for same, the Standard Tire & Rubber Co. being no longer able to take care of all the New England business.

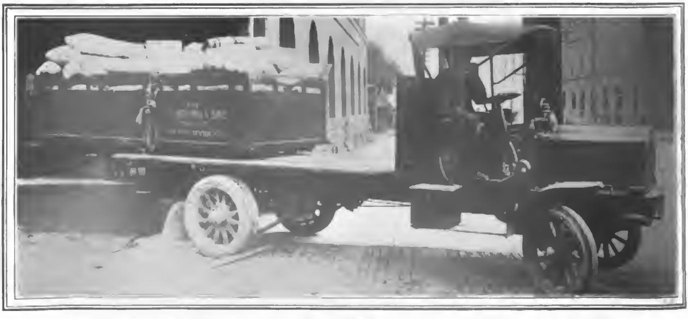
The Werner Radiator Co., Chicago, Ill., has been succeeded by the National Radiator Co., in the manufacture of heavy duty truck radiators. This new company took over all the assets and contracts of the Werner Radiator Co., and is incorporated in the State of Illinois for $30,000.

Henry E. Riker & Co., Cleveland, O., have been appointed state distributors for Ohio for the Stewart Motor Corp. Headquarters will be at Cleveland, where a large service station is to be fitted up on Euclid avenue. Mr. Riker was formerly general auditor for the Firestone Tire & Rubber Co.

The appointment of two new district managers has been made by the Stewart Motor Corp., Buffalo, N. Y., makers of the Stewart light delivery truck—E. E. Dennison, covering Illinois, Eastern Iowa and Missouri, with headquarters at Chicago, and W. T. Butler, covering New York State and Northern Pennsylvania, with headquarters at Buffalo.

The Oliver Motor Truck Co. has been recently organized by several Detroit business men, who have purchased all rights of future manufacture and taken over the larger share of assets of the Oliver Motor Car Co. The officials are Gus A. Meyer, president and general manager; Fred J. Meyer, treasurer, and R. F. Beach, general sales manager.

David C. Fenner was recently appointed New York branch manager of the International Motor Co., New York



Special Body on Packard 3-Ton Truck, Designed to Facilitate Handling of Merchandise for Short Hauls.

Fleet of General Vehicle Trucks in the Service of the Fair, Chicago, Ill.

City. Robert E. Fulton, former branch manager, was promoted to the position of assistant to general sales manager W. S. Stevenson. C. W. Stratford, consulting engineer, has succeeded Edward R. Hewitt, resigned, as chief engineer.

The following change has been made in the personnel of the Milwaukee Motor Co.: Mr. Warner as president, Mr. Kaiser as secretary and treasurer, and all the other stockholders' interests have been purchased by the above officers, and Ernst Miller, president of the Miller Brewing Co., and James S. Church, for 27 years general superintendent of the E. P. Allis and Allis-Chalmers Co.

The Stromberg Motor Devices Co., Chicago, Ill., manufacturers of Stromberg carburetors, has opened its own direct branch in Detroit, Mich., at 463-465 Woodward Avenue. In conjunction with salesroom and office a special garage for exclusive Stromberg service is also included with this establishment, with a competent corps of mechanics and engineers maintained throughout the year. The branch is under the direction of Mr. N. H. Miniter, sales manager of the Stromberg Motor Devices Co.

J. R. Elliott has been appointed district manager of the Lippard-Stewart Motor Car Co., of Buffalo, N. Y., for the States of Washington, Idaho and the Province of British Columbia.

The Bosch Magneto Co., New York City, for the first time since 1909, will not exhibit its products at either the New York or Chicago Automobile show. Commodious quarters are being arranged at their main office, 223-225 West Forty-sixth street, New York City, and also at their Chicago branch, Twenty-fourth street, near Michigan avenue.

"Gasoline Engines, Their Operation, Uses and Care" is the title of a book recently published by the Norman W. Henley Publishing Co., New York City, dealing with gasoline engines for stationary, marine or vehicle use. The book has been written especially for the owner who is unfamiliar with technicalities and who is not a mechanical engineer. The cuts illustrating the book are simple and plain and purchasers of a motor vehicle should have no trouble in becoming fully acquainted with the construction of the engine, with the use of this book.

The Fisk Rubber Co., Chicopee, Mass. Capital $10,000,000. Incorporators: Harry T. Dunn, Harry G. Fisk and John C. Cole.

U. S. Puncture Proof Tire Filler Co., Boston, Mass. Capital $50,000. Incorporators: R. E. Magee, Austin Wilson and W. H. Wood.

Peets-Homan Corporation, New York, N. Y. To manufacture and sell all kinds of motors, engines, etc. Capital $2,000. Incorporators: John A. Bolles, Clifford S. Peets and Frank D. Homan.

Eldridge Manufacturing Co., Boston, Mass. Automobile business. Capital $25,000. Incorporators: Jane C. Eldridge, Wm. E. Eldridge and C. A. Brown.

Soule-Smith Company, Portland, Me. To manufacture and deal in vehicles of all kinds. Capital $10,000. Incorporators: William E. Soule and Alfred T. Smith.

Cosmopolitan Rubber Company, Boston, Mass. Rubber goods, tires, etc. Capital $2,500. Incorporators: S. Miller, Eli Miller and B. Levenson.

Davis King Company, Acton, Mass. Motor vehicle business. Capital $20,000. Directors and officers: A. W. Davis, president, Acton, Mass.; Hobart E. Mead, West Acton, Mass., treasurer, and B. A. King, Acton, Mass.

Patterson Rubber Company, Lowell, Mass. Rubber goods, tires, etc. Capital $500,000. Incorporators: John S. Patterson, Francis H. Appleton and F. H. Appleton, Jr.

Reliable Auto Parts Company, Inc., New York, N. Y. Capital $2,000. Incorporators: Adolph J. Lunde, Hubert Hansen and Adolph Sachroff.

Commercial Vehicle Incorporations

Twin City Auto Co., Inc., North Tonawanda, N. Y. Capital $5,000. Incorporators: Walter A. Arens, Raymond LeRoy Herschell and Frank J. Wallenberg.

Snowden Rubber Co., Inc., New York City. To manufacture tires, etc. Capital $1,000. Incorporators: Weslet T. Snowden, Edward J. Landgraff and A. Bidney Galitzka.

The Motormeter Co., Inc., New York City. To manufacture devices for automobiles, etc. Capital $5,000. Incorporators: George H. Townsend, Harrison H. Boyce and Frederick J. Moses

R. H. Conty & Co., Inc., New York City. Manufacture and sale of motors, parts, etc. Capital $2,500. Incorporators: R. Henry Conty, M. Conty and Emil Frankel.

Mount Vernon Local Auto Express Co., Inc., Mount Vernon, N. Y. Capital $1,500. Incorporators: Luci Jacobson, Elizabeth Jacobson and Fred Cardillo.

Lafayette Motor Sales Co., Inc., Buffalo, N. Y. Capital $10,000. Incorporators: Joseph A. Groh, Frank J. Batt and Annie E. Groh.

The Carbone Co., Inc., Albany, N. Y. Deal in all kinds of rubber tires, etc. Capital $200,000. Incorporators: W. E. Greene, G. C. Leonard and W. G. Van Loon.

A.M.A. Co., Inc., New York City. Deal in motors, engines, etc. Capital $5,000. Incorporators: N. Pohly Myers, Walter C. Allen and Harry N. Allen.

Columbia Taxicab Co., Inc., New York City. Capital $5,000. Incorporators: John Graham, James Pathe and Patrick Garrity.

Star Motor Car Co., Augusta, Me. Capital $1,000,000. Incorporators: N. L. Goodell, Walter M. Sanborn.

The Newbury Auto Co., Boston, Mass. Capital $5,000. Incorporators: Ernest L. Rowe, G. W. Mullett and P. J. Scanlon.

Power Truck Sales Co., Worcester, Mass. Capital $25,000. Incorporators: Edwin Churchill Jr., B. E. Delle and A. G. Dodge.

The Goodyear Tire and Rubber Co. of South America, Williamson, Me. Capital $3,000,000. Incorporators: E. M. Leavitt, Joseph Williamson.

Maine Power Truck Co., Portland, Me. Capital $10,000. Incorporators: Irving L. Peabody, George E. Peabody and Harry E. Nixon.

Miller-Brisben Co., Inc., New York, N. Y. Deal in motor vehicles, etc. Capital $25,000. Incorporators: Warren A. Miller, Irving Jaffee and John McNeil Brisben.

Stegeman Motor Truck Co. of New York, Inc., New York, N. Y. Capital $25,000. Incorporporators: John G. Anderson, James G. Smith and John A. Kent.

Tuxedo Tire Co., Inc., Bronx Borough, New York City. Capital $8,000. Incorporators: Augusta Hormann, Emilie Waltenberg and Adolph Waltenberg.

American Kushion Kore Tire Co., Inc., Buffalo, N. Y. Capital $10,000. Incorporators: Chas. H. Taylor, Christopher M. Baldy and Karl E. Wilhelm.

Eliot Motor Car Co., Inc., Boston, Mass. Capital $250,000. Incorporatore: M. H. Libby, William D. Wallace and R. G. Houston.

J. and B. Mfg. Co., Pittfield, Mass. Electrical vehicles, motor cars, etc. Capital $25,000. F. A. Knight, Edward B. Jacobson and J. J. Whittlesey.

Panther Rubber Manufacturing Co., Stoughton, Mass. Tires, rubber goods, etc. Capital $150,000. Incorporators: Frank Bernstein, Wm. Bernstein and M. Marcus.

The Metcalf Auto Co., Farmington, Me. Capital $10,000. Officers and directors: John G. Morton, Jr., president; J. C. Metcalf, treasurer and clerk, both of Farmington, Me.

Cahill Auto Works, Inc., New York City. Capital $6,000. Incorporators: Andrew J. Cahill, Henry J. Cahill and Charles E. Trainor.

New Commercial Vehicle Agencies

Place	Car.	Agent
Boston, Mass.	Atlantic	Chas. D. Daly
Rochester, N. Y.	Sanford	Mandery Motor Car Co.
New York City	Sanford	Exp's, Strong & Trowbridge
London	Sanford	Exp's, Strong & Trowbridge
Paris	Sanford	Exp's, Strong & Trowbridge
Melbourne	Sanford	Exp's, Strong & Trowbridge
Durban	Sanford	Exp's, Strong & Trowbridge
Constantinople	Sanford	Exp's, Strong & Trowbridge
Sidney	Sanford	Exp's, Strong & Trowbridge
Aukland	Sanford	Exp's, Strong & Trowbridge
Manila	Sanford	Exp's, Strong & Trowbridge
Buenos Ayres	Sanford	Exp's, Strong & Trowbridge
Valparaiso	Sanford	Exp's, Strong & Trowbridge
Porto Rico	Sanford	Exp's, Strong & Trowbridge
Minneapolis, Minn.	McIntyre	MacArthur-Zollars-Thompson Co.
Kansas City, Mo.	Gramm	Bond Motor Car Co.
Columbus, O.	Gramm	O. G. Roberts & Co.
Petersburg, Va.	Gramm	Virginia Transfer Co.
Middletown, O.	Gramm	E. T. Gardner.
Washington, D. C.	Gramm	Overland-Washington Motor Co.
Richmond, Va	Gramm	W. D. Sepp
Jacksonville, Fla.	Gramm	Savannah Supply Co.
Canton, O.	Gramm	Wise-Breen Motor Co.
Waukesha, Wis.	McIntyre	O. C. Harrison
Chatham, Ont.	McIntyre	Canadian-McIntyre Co.
Boston, Mass.	McIntyre	E. P. Blake
Dusseldorf, Germ'y	Packard	Carl Dreymann
Worcester, Mass.	Universal	E. E. Dodge
Winsted, Conn.	Universal	Roscoe Benjamin
Boise, Idaho	Universal	C. R. Shaw
Richmond, Va.	Universal	Alsop Motor Co.
Seattle, Wash.	Universal	Star Carriage Co.
New Haven, Conn.	Universal	James McLey
Cleveland, O.	Universal	Universal Truck Co. of Cleveland
Washington, D. C.	Universal	J. Edward Chapman
Vicksburg, Miss.	Universal	Mississippi Motor Truck Co.
St. Paul, Minn.	Wilcox	E. H. Nolan
Memphis, Tenn.	Wilcox	L. C. Nolan
St. Louis, Mo.	Smith	Geo. C. Brinkman Motor Car Co.
St. Paul, Minn.	Smith	Motor Truck Co.
Cincinnati, O.	Smith	Commercial Motor Sales Co
Los Angeles, Cal.	Brooks	Bentley & Codd
Raymond, Ill.	Brooks	T. J. Potterf
Springfield, Mass.	Brooks	J. R. C. Browning
Brooklyn, N. Y.	Brooks	New York Auto Wagon Co.
Sydney, Aus.	Lansden	Federal Storage Battery Car Co.
Paris, France	Lansden	John F. Monot
London, Eng.	Lansden	John F. Monot
Winnipeg, Can.	Lansden	Boyce Carriage Co.
Miami, Fla.	Lansden	Miami Electric Light & Power Co.
Cincinnati, O.	Alco	Peters & Keating
Cleveland, O.	Alco	Maurice Rohrheimer
Jacksonville, Fla.	Alco	Wiesenfeld Warehouse Co.
Miami, Fla.	Alco	Charles Jones
Syracuse, N. Y.	Alco	Jefferson Garage Co.
Tampa, Fla.	Alco	Chas. H. Moorhouse
Kalamazoo, Mich.	Federal	Kalamazoo Auto Sales Co.
Hartford, Mich.	Federal	Chas. A. Spaulding Co.
Hastings, Mich.	Federal	Chas. H. Osborn
Douglas, Mich.	Federal	W. J. Kirby
Holland, Mich.	Federal	J. G. Kamps
Shelby, Mich.	Federal	Neil Webeke
Pentwater, Mich.	Federal	E. A. Daggett
Manistee, Mich.	Federal	Auto Garage Co.
Petoskey, Mich.	Federal	Chas. E. Smith
Boyne Falls, Mich.	Federal	H. C. Meyer
Reed City, Mich.	Federal	Theo. Schmidt
Howard City, Mich.	Federal	A. B. Potts
Fremont, Mich.	Federal	L. D. Puff
Greenville, Mich.	Federal	J. E. Osmun
Ionia, Mich.	Federal	Ross Benedict
Saranac, Mich.	Federal	Wilkinson Ogilvie
Rockford, Mich.	Federal	Geo. Hessler
Freeport, Mich.	Federal	Miller & French
Traverse C'y, Mich.	Federal	Traverse City Iron Works
Columbus, O.	Federal	Coates Motor Co.
Birmingham, Ala.	Federal	The Birmingham Motor Co
Newp't News, Va.	Federal	Peninsular Auto & Garage Co.
Norfolk, Va.	Federal	Roethke Bros.
Roanoke, Va.	Federal	Yost-Huff Co
Allentown, Pa.	Stewart	Allen Motor Company.
St. Paul, Minn.	Stewart	Borg & Wharry Motor Co.
Portland, Ore.	Stewart	Coast Commercial Car Co.
Utica, N. Y.	Stewart	Crim-Bronner Auto Co.
Los Angeles, Cal.	Stewart	Albert Biner.
St. Louis, Mo	Stewart	Federal Truck Co. of St. Louis.
Philadelphia, Pa.	Stewart	Gomery-Schwartz Motor Car Co.
Wilmington, Del.	Stewart	Gomery-Schwartz Motor Car Co.
Rochester, N. Y. (Packard)	Stewart	Mandery Motor Car Co.
Nashville, Tenn.	Stewart	Martin & Crocker.
Baltimore, Md. (also)	Stewart	R. Stuart Beaver.
Edmonton, Alberta.	Stewart	Northrup Motor Service Co
Salem, Mass.	Stewart	North Shore Motors & Service Co.
Wilkesbarre, Pa.	Stewart	Koons & Hallier.
Cleveland, Ohio	Stewart	Henry E. Riker & Co.
Savannah, Ga.	Stewart	Savannah Motor Car Co.
Houston, Tex. (Packard)	Stewart	Young & Dwire.
Buffalo, N. Y.	Stewart	Reimold Bros.

G. M. C. Electric Truck Tower Wagon for Emergency Work

Adams Truck, Used by the American Glycerin Co.

Cost Systems for Truck Operation

Twenty Cents a Copy Two Dollars a Year

The COMMERCIAL VEHICLE

Vol. VII DECEMBER 1912 No. 12

Some of the Fleet of 28 Alco Trucks Operated by the American Express Co.

EXPRESS Companies Have $251,300 Invested in Alco Trucks

Five express companies have $251,300 invested in Alco trucks. Here follows their testimony in figures and facts:

American Express Co.	**$102,200**
Adams Express Co.	**14,400**
Long Island Express	**73,000**
Wells, Fargo & Co.	**17,700**
Westcott Express Co.	**43,800**

The American Express Co. operate 28 Alcos. They were purchased on nine repeat orders. The Long Island Express operate 20 Alcos.

Ten were re-ordered on the strength of service rendered by the first ten. For the Adams Express Co. a 3½-ton Alco truck during the Christmas rush ran for six days and nights without stopping the motor. For the United States Express Co. another Alco of the same capacity operated for 336 hours in non-stop service, and set the world's record.

Write for the new 112 page Catalog.

ALCO
Motor Trucks
6½ ton 5 ton 3½ ton 2 ton

AMERICAN LOCOMOTIVE COMPANY, 1896 Broadway, NEW YORK
Builders of Alco Motor Cars and Alco Taxicabs

Chicago Branch: 2501 Michigan Avenue
Boston Branch: 567 Boylston Street

Montreal Branch:
480 St. Catharine Street, West.

Movers of the World's Goods since 1835. Capital, $50,000,000

The COMMERCIAL VEHICLE, Inc., 231-241 West 39th St., NEW YORK

PEERLESS TRUCKS

Save 50% on Interurban Freights

A HUNDRED miles a day with a quarter of a carload of miscellaneous freight is the average performance of this 5-ton long chassis Peerless.

Two round trips between Boston and Brockton total 88 miles of direct travel. Collection and distribution of the loads in each city raises the average 12 to 20 miles more.

In addition to establishing the freight time at three hours between shipment and receipt of goods over a 22 mile route this Peerless has cut the expense in two.

Truck Department

THE PEERLESS MOTOR CAR CO.

Cleveland

Builders also of Peerless Passenger Cars

Every Part is Designed for Heavy Truck Duty

A famous American engineer designed the Locomobile Five-Ton Truck, and commercial cars designed by him fourteen years ago are still in use and giving satisfaction.

The strength of Locomobile design can be appreciated best by a comparison. For example: Compare the Locomobile Truck Motor with a well-known touring car motor of the same bore and stroke and noted for its strength of design.

The Locomobile Truck Motor has 5 bearings; the other motor 3 bearings.

The Locomobile Truck Motor has a crankshaft 2.25 inches in diameter. The touring car motor crankshaft is 1.75 inches in diameter.

The Locomobile Truck Motor has a total crankshaft bearing surface of 41.3 square inches; the other 21.5 square inches.

The Locomobile Truck Motor has larger valves, larger connecting rods, and larger connecting rod bearings. All other parts of the Locomobile Truck show the same careful and ample design for heavy truck duty and no touring car parts enter into its construction.

Other important features of the Locomobile Five-Ton Truck are:

Every part designed for heavy truck duty.
Highest standards of workmanship.
Best materials used.
Motor—45 H.P. at 900 R.P.M.
Five bearing crank shaft.
Four speed transmission.
Large transmission gears.

These features combined only in the Locomobile Five-Ton Truck

Interchangeable demountable tires.
Driving chains each stand 44,000 lbs. pull.
Differential lock.
Steel wheels.
Dry disc clutch.
Sprags.
All parts easily accessible.

Ignition and oiling system not subject to driver's control.

THE LOCOMOBILE COMPANY OF AMERICA, Bridgeport, Connecticut

Service and Sales Branches:

New York, Chicago, Philadelphia, San Francisco, Boston, Pittsburgh, Washington
Atlanta, Los Angeles, St. Louis, Minneapolis, Baltimore, Oakland, Bridgeport

This advertisement is Number 6 in a Series Descriptive of Locomobile Design and Construction

THE LONG DISTANCE

ATLANTIC

ELECTRIC TRUCKS

When you purchase an ATLANTIC ELECTRIC TRUCK you are obtaining a product on which no expenditure has been spared to produce the highest grade truck that it is physically possible to build.

Atlantic Electrics are built in the following capacities:

1—2—3½—5-ton

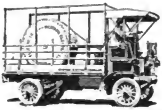
The main points to consider in delivery trucks are Simplicity, Reliability, Efficiency, Long Life and Low Cost of Operation.

In these, Atlantic Trucks excel.

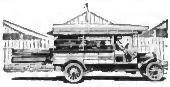
Our Engineering Department will help solve your transportation problems.

ATLANTIC VEHICLE CO. 1600 BROADWAY
NEW YORK CITY

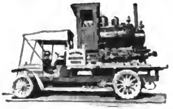
Factory, Newark, N. J.
10 Post Office Sq., Boston
Service Dept. in New York



The Associated Bell Telephone Companies have 89 of our trucks in service. These represent almost weekly orders.



The Pennsylvania Railroad uses our trucks at its Harrisburg Terminal for moving supplies about between the various shops.



The Baldwin Locomotive Works are using ten of our trucks. Four of these displaced 24 horses and 12 wagons, with a saving of 33⅓ per cent per year over horse equipment.

It will pay you

to find out just what motor-truck transportation will do for your business, as compared with horse equipment—and at what cost.

No other organization is so well qualified to help you solve your problem as our Engineering Department.

Mack Saurer Hewitt

Proved by 12 years of service Proved by 18 years of service Proved by 10 years of service

"Leading Gasoline Trucks of the World"

have been in use more years than any other trucks built—8000 of them—in every kind of business—all over the world.

Nine sizes, 1 to 10 tons capacity. Bodies for all kinds of work, built in our own plant.

Our own Engineering Department has complete data on transportation costs—horse as well as motor-truck—for every kind of business. Consult it freely—direct or through any of our representatives.

Write for our literature

International Motor Company

General Offices: Broadway and 57th St New York Works: Allentown Pa; Plainfield N J

Sales and Service Stations: New York, Chicago, Philadelphia, Boston, Cleveland, Cincinnati, Buffalo, Baltimore, Newark Pittsburgh, St Louis, Atlanta, Kansas City, Denver, San Francisco, Los Angeles and other large cities

Canadian Sales Agents: Canadian Fairbanks-Morse Company, Limited, Montreal

→ 95% ←

THE efficiency of a set of motor vehicle driving chains as a power transmitting medium may be as high as 95% on a bench test.

This efficiency is never realized however after the vehicle is put in service, owing (among other factors) to the lack of lubrication and the presence of water, grit and wear. Tests have been made indicating that the efficiency of the chain drive is frequently found to be as low as 60% when improperly cared for.

What is the solution of chain care?
Answer

CHAIN DOPE

A lubricant that *penetrates* to every roll and pin and one that water, pressure or centrifugal force *does not disturb.*

Sold in 1, 5, 10 Gallon Cans and Barrels

For further information address

Eagle Oil & Supply Co.
104 Broad Street BOSTON, MASS.

Champion Priming Plugs Start Any Motor on First Quarter Turn

Open needle valve slightly (you needn't remove glove) and inject gasoline. Passing through its own channel to plug base, it vaporizes directly at spark point.

No matter how cold your cylinders or how severe the weather conditions, **Champion Priming Plugs** will start your engine *any time and every time* on the first quarter turn, because they insure both a hot, fat spark and a rich mixture right at the plug's firing points.

Absolutely necessary in cold weather for *most* cars. An important addition the year 'round on *all* cars.

Don't lose time with your car or truck in the winter season. **Champion Priming Plugs** save towing bills or the cost of help from a garage.

Champion Spark Plugs are regular equipment of over 60% of the cars in America today. **Champion Priming Plugs** go to you with our assurance that they are not only perfect spark plugs, but perfect priming devices.

We guarantee both workmanship and entire satisfaction or your money back.

If your dealer is not ready to supply you with **Champion Priming Plugs,** send us $5 in any convenient form, and we will send you a set of four, prepaid. Give name and year of your car and name of your dealer.

Be sure the name "Champion" is on the porcelain.

CHAMPION SPARK PLUG CO.
120 Upton Ave. TOLEDO, OHIO

Index to Advertisers

Page
Adams Bros. Co 86
Aluminum Castings Co., The 80
American Locomotive Co ..... cover
Anderson Electric Car Co 101
Atlantic Vehicle Co 2
Autocar Company 4
Automobile Supply Mfg. Co 89
Avery Company 86

Baker Motor-Vehicle Co., The 109
Baldwin Chain & Mfg. Co 91
Barthel, Daly & Miller 87
Bessemer Motor Truck Co 75
Booth, N. E 81
Borne Scrymser Co 80
Bosch Magneto Co 89
Bower Roller Bearing Co 80
Bowling Green Motor Car Co 112
Brennan Motor Mfg. Co 79
Bretz Co., J. S 84
Briscoe Mfg. Co 80
Brown Commercial Car Co 114-115
Buckeye Mfg. Co., The 88
Buda Company, The 98
Bush Mfg. Co., The 81

Champion Ignition Co 69
Champion Spark Plug Co 68
Chase Motor Truck Co 76
Cleveland-Canton Spring Co., The 80
Continental Motor Mfg. Co 89
Couple-Gear Freight-Wheel Co 83
Covert Motor Vehicle Co 81
Cramp & Sons, Wm., Ship & Engine Building Co 70
Cullman Wheel Co 81

Detroit Lubricator Co 89
Diamond Chain & Mfg. Co 98

Eagle Oil & Supply Co 68
Eisemann Magneto Co., The 95
Electric Storage Battery & Mfg. Co 94
Electric Vehicle Association of America 108
Essex Rubber Co., Inc 83
Eureka Non-Skid Mfg. Co 75

Fedders Mfg. Works 92
Federal Chain & Mfg. Co 96
Federal Motor Truck Co 131
Firestone Tire & Rubber Co., The 71

Garford Company, The 127
General Motors Truck Co 113
General Vehicle Co ..... cover
Gibney & Bro., Jas. L 77
Goodrich Co., B. F 203
Goodyear Tire & Rubber Co 77
Gramm Motor Truck Co., The 126
Grand Rapids Motor Truck Co 76
Gurney Ball Bearing Co 85

Harwood-Barley Mfg. Co 130
Herschell-Spillman Co 78
Hess-Bright Mfg. Co 85
Holley Bros. Co 73
Hyatt Roller Bearing Co 77

International Motor Company 67

Jarvis-Huntington Automobile Co 126
Jewell Steel & Malleable Co 77
Jones & Co., Phineas 87
Jones Speedometer, The 90
Juno Motor Truck Co 76

Kelly-Springfield Tire Co 106
Kissel Motor Car Co 122
Knickerbocker Motor Truck Co 77
Knox Automobile Co 86
Kopp Motor Truck Co 77
Krebs Commercial Car Co., The 111

Lauth-Juergens Motor Car Co 120
Liggett Spring & Axle Co 83
Lippard-Stewart Motor Car Co 123
Livingston Radiator & Mfg. Co 77
Locomobile Co. of America 1
Lyon Non-Skid Co 93

Mais Motor Truck Co 128-129
Mather Spring Co., The 77

Index to Advertisers

Page
Merchant & Evans Co. 84
Michigan Steel Casting Co. 82
Model Gas Engine Works 91
Moss Photo Engraving Co. 80
Motor Truck Body Co. 75
Motz Tire & Rubber Co. 85
Muncie Gear Works 75
McIntyre Company, W. H. 76

National Automobile Show 107
National Motor Truck Co. 119
New Departure Mfg. Co. 78
Norma Company of America, The 93
Nyberg Auto Works 88

Oakes & Dow Co. 81
Old Reliable Motor Truck Co. 76
Otis Elevator Co. 70

Packard Motor Car Co. 134
Palmer-Moore Co. 87
Peerless Motor Car Co. .... cover
Perfection Spring Co. 90
Pierce Arrow Motor Car Co. 118
Pittsfield Spark Coil Co. 78
Polack Tyre & Rubber Co. 74
Positive Lock Washer Co., The 78

Recording Speedometer Co. 3
Remy Electric Co. 90
Republic Rubber Co., The 79
Rhineland Machine Works Co. 81
R. I. V. Co. 69
Rome Hollow Wire & Tube Co. 80
Ross Gear & Tool Co. 104
Royal Equipment Co., The 78
Rutenber Motor Co., The 78

Sandusky Auto Parts & Motor Truck Co. 76
Sanford Motor Truck Co., The 86
Sarco Engineering Co. 87
Schwarz Wheel Co. 94
Selden Truck Sales Co. 117
Service Recorder Co., The 95
Sewell Cushion Wheel Co. 102
Sheldon Axle Co. 72
S. K. F. Ball Bearing Co. 82
Smith Co., A. O. 79
Speedwell Motor Car Co., The 75
Spicer Mfg. Co. 79
Sprague Electric Works 79
Spring Perch Co. 78
Standard Gauge Steel Co. 90
Standard Motor Truck Co. 116
Standard Welding Co. 79
Standard Wheel Co. 105
Stegeman Motor Car Co. 88
Stewart Iron Works Co. 132-133
Stewart Motor Corporation 88
Sullivan Motor Car Co. 76
Swinehart Tire & Rubber Co. 97

Team Owners' Review 80
Timken Detroit Axle Co., The 101
Timken Roller Bearings Co., The 101
Torbensen Gear & Axle Co. 82

Union Drop Forge Co. 100
United States Ball Bearing Co. 84
United States Light & Heating Co. 83
United States Tire Co. 79
Universal Motor Truck Co. .... cover

Van Wagner Mfg. Co., E. B. 79
Veeder Mfg. Co. 82
Victor Motor Truck Co. 76
Victor Rubber Co., The 92

Waukesha Motor Co. 85
Weston-Mott Co. 97
White Company, The 125
Whitney Mfg. Co. 99
Wilcox Motor Car Co., H. E. 75
Wisconsin Motor Mfg. Co. 81

Zenith Carburetor Co. 96

FOR SALE—Two worm-drive rear axles, designed to carry 5,000 lbs. load—made by Morse-Williams Division of Otis Elevator Co., Philadelphia, Pa. Have never been in service. Make us an offer for them. Sheldon Axle Company, Wilkes-Barre, Pa.

Hard Truck Service

You have surely experienced spark plug trouble from time to time.

You have probably tried several makes of plugs.

You are probably tired of trying, as you find it expensive.

We would be glad to send you, ***on approval,*** a set of our indestructible AC 1913 plugs with unbreakable Steatite insulators.

Write Us

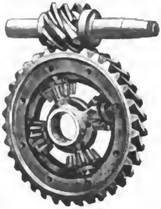
Champion Ignition Company
Flint, Michigan

R. I. V. Ball Bearings are mathematically correct. They have the greatest degree of accuracy ever attained in ball bearings, resulting in least variation in measurements in any number of bearings of a given size.

They are double-efficiency ball bearings and have made a record that no other anti-friction bearings can approach.

R. I. V. Bearings have a reputation of having been tested in the most trying service and **never failing to make good.**

R. I. V. Company
1771 Broadway New York



THE GEAR

Buy Your Bronze in America

Cramp's Gear Bronzes for Rear Axle Drive

The modern up-to-date drive for both touring cars and trucks is a steel worm and a bronze worm wheel. Our gear metals long ago passed the experimental stage. We have been manufacturing worm drives for nearly 100 years for all kinds of machinery from turret turning gear to lifting bridges, elevators, marine railways, etc., and we are now furnishing our worm gearing for automobiles.

Our metals will better resist wear and abrasion, have longer life and higher efficiency than any other gearing metals and have the great strength necessary to resist heavy starting torque. They are designed to withstand excessive strain and shock, and this strength is given to them without impairing their wearing and anti-frictional qualities.

There is no need of importing bronze wheels for worm drives. We manufacture better material and you save DUTY, FREIGHT and TIME.

These castings are furnished by

The Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, Pa.

and are machined either as spiral or straight gears by the

Otis Elevator Company (Hindley Worm Gear Dept.), Philadelphia, Pa.

Equip your Cars with this Modern, Up-to-date Drive

Hindley Spiral Gear Axle

Increases Length of Service, Decreases Cost of Upkeep

The Gears run in oil and are absolutely noiseless. Being enclosed, they are positively dust-proof and trouble-proof. They maintain their high efficiency to the end of the life of the metal and will outwear a dozen chains. They admit of great reduction without the use of very large gears, and will coast freely.

Hindley Spiral Gear Axles have back of them the vast engineering experience of the Otis Elevator Company, which insures their mechanical correctness. Equip your Cars with this modern, up-to-date drive—they will add greatly to the efficiency of your product.

Hindley Spiral Gear Axles are being used with the utmost success by a number of motor vehicle manufacturers who will be glad to tell you of their experience.

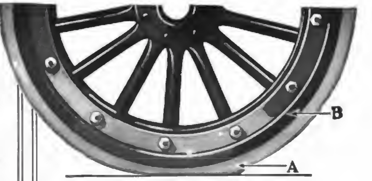
Full Particulars on Request

[illegible]

THE AXLE

STUDY the illustrations! They show how you can double the efficiency and profit of your heavy service truck.

The upper cut shows the "traction" wave always formed in the ordinary continuous tire under heavy load. This wave, caused by the bulging of the rubber, works into the base and tears the tire from its fastenings. It can't be avoided in any ordinary way. Then, too, this wave forms a constant hill—the tire is always climbing, retarding progress, reducing power efficiency.



Showing traction wave in ordinary continuous tire. (A) indicates where wave forms. (B) indicates base where roll and tread separation occur.

Contrast this condition with the profit-making worth of—

Firestone

Continuous Base—Notched Tread

Truck Tires

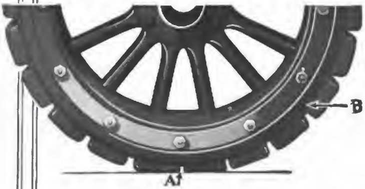
The lower cut shows how the Firestone Notched Tread overcomes the wave, by preventing its formation. This is *not* an individual block tire, with tread-tearing, metal-retaining plates. The Firestone continuous base is of the same tough, resilient compound as the tread. These tires hold the road, increase traction, absorb all vibration.

Get the full facts. They mean Economy and Increased Profits.

Firestone Truck Tires for Every Type of Car, Every Load, Every Road Condition

The Firestone Line of Truck Tires has in it the tire, solid or pneumatic, you need for your particular service. Get the books which tell the story. Ask, as well, for Quick Removable Rim facts. They are valuable.

The Firestone Tire & Rubber Co.
"America's Largest Exclusive Tire and Rim Makers"
Akron, Ohio—Service Stations Everywhere



Showing how Firestone Notched Tires overcome destructive traction wave. (A) indicates wave passing off into space between blocks. (B) indicates continuous base—assuring absorption of vibration in every direction.

SHELDON

Brake Equipment E-11

New Features Unusual Stee

Highest Braking Efficiency

Drivers of Trucks That Carry This Equipment Have a Satisfactory Feeling of Safety That Comes Only With Knowledge of Absolute Control

℄ We claim for the E-11 Brake Equipment, out-of-ordinary features of strength, quick response, power and durability, with various sections figured for a load of 3000 pounds—50% overload—80% on the rear and skidding the rear wheels. ℄ Fifty pounds pressure on the foot pedal will bring the truck to rest in the shortest possible braking distance Material factor of safety 4 to 1. ℄ Blue prints and specifications on request.

SHELDON AXLE COMPANY, Wilkes-Barre, Pa.

DETROIT BRANCH: 1215 WOODWARD AVE CHICAGO BRANCH: 68 E. 12th St

HOLLEY

CARBURETOR

Mr. Truck Manufacturer!

What will your customers say when they will have to pay an **additional insurance** charge because you equip your truck with a carburetor having an air intake on the bottom?

The air intake on the Holley carburetor is **not** on the bottom, and it is so arranged that it is **impossible to take fire if the motor should "back-fire."**

NO MOVING PARTS

Read these two extracts from letters from the Liverpool London & Globe Insurance Company, Ltd., Chicago

"Approximately 75 per cent of the fire losses on automobiles are caused from 'back-fire' and the insurance companies will find it necessary to make an additional charge in the rate on automobiles equipped with carburetors having an intake at the bottom."

"Your carburetor meets with our approval and we shall be glad to convey this information to the companies insuring automobiles."

The following truck manufacturers now use Holley carburetors:

Reo Motor Truck Company,	Lansing, Mich.
Universal Motor Truck Company,	Detroit, Mich.
Chase Motor Truck Company,	Syracuse, N. Y.
Motor Wagon Company,	Detroit, Mich.
Reliance Motor Truck Company,	Owosso, Mich.

Send for description of new self-adjusting, no-moving-parts Holley.

HOLLEY BROTHERS COMPANY
136 Rowena Street Detroit, Michigan

POLACK TYRES

BRIDGEPORT, CONN.

POLACK TYRES

The NEW AMERICAN HOME of POLACK TYRES

S. A. E. Standard Polack Tyres Added to European Standard

BUT NO DEMOUNTABLE—THE DECISION NOW

No Longer at Jeannette

THE POLACK TYRE & RUBBER COMPANY announces that it is no longer manufacturing at Jeannette, Pa., and that the manufacture of the well known POLACK TRUCK TYRE will hereafter be carried on in its own factory at Bridgeport, Conn., where greater facilities have been provided and the capacity largely increased.

Reputation Abroad Made Good in America

That the POLACK TRUCK TYRE during its establishment on the American market has made good its reputation abroad needs no comment here—its mileages throughout the country bear testimony to the fact.

Success of Metal Base—Polack Feature

Also it is a gratifying reflection upon the uniform success of the Metal Base Construction which has been characteristic of the POLACK TYRE for over ten years since it was first originated and adopted by the Parent Company in Germany, that most of the American tyre manufacturers have finally followed and adopted that construction.

S. A. E. Standard Sizes

AND NOW IN ADDITION to the usual Metric sizes of European Standard, which vary in sectional height from 62 m-m (2 1-2 inches) to 100 m-m (4 inches), the POLACK TRUCK TYRE is now made for the American market in the S. A. E. Standard sizes which are of a uniform thickness of 2 3-4 inches.

Demountable Excluded—and Why

While adding to the line of POLACK TYRES in America, the subject of the Demountable type received exhaustive study. Impartial investigation shows that the types of quick demountable tyres which are in the market at present have not proved as satisfactory in actual service as was expected, and until mechanical skill has progressed further in this direction, the POLACK COMPANY, pending further experiments, will confine itself to the production of the Pressed-on type of tyre exclusively, as it has done from its inception.

NEW PRICE LISTS

New Price Lists have been issued and are available upon request
Your inquiries are invited

POLACK TYRE & RUBBER COMPANY

Principal Offices: 246 West 59th Street, New York

BRANCHES AND SERVICE STATIONS

Boston — Philadelphia — Chicago — Kansas City — St. Louis
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13126 MILES
11455 MILES
12562 MILES
THREE YEARS

19650 MILES
15000 MILES
12000 MILES
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15572 MILES

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No side chains, no cross chains. The fastening chain runs between the tires, and the diamond drop forged plates give the traction.

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591 Bergen Street BROOKLYN, N. Y.

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Bessemer Motor Truck Company, Grove City, Pa.
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A Travelling man from Milwaukee, Wis. told us that we had the nicest Furniture Truck he had seen between Wisconsin and New Castle and we have had several other flattering testimonials from other traveling men. In fact, we like our truck better than any we have ever seen for our business, regardless of price.

We feel that we would be doing any firm a favor in recommending a BESSEMER Truck to them.

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W. F. DUFFORD & COMPANY.

Bessemer Motor Truck Company

GROVE CITY, PA.

Branches: BOSTON, MASS.
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The owners of Wilcox Trux have a daily demonstration of their superiority.

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Ton capacity - $3,500
Ton capacity - 4,500

Prices include standard stake or side board express body.

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2 "	20	" 1500	"	950	Chassis
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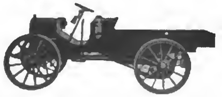

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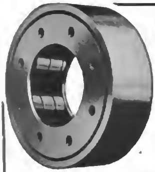

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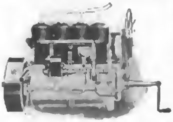

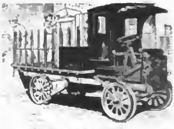

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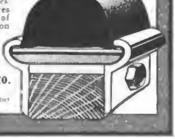

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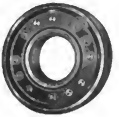

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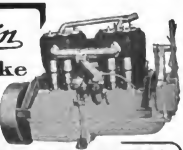

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Patent Allowed.

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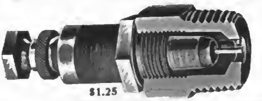

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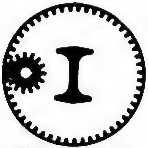

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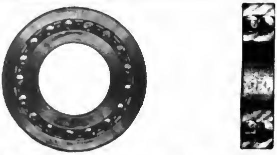

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MICHIGAN STEEL CASTING CO., Detroit, Michigan

LIGGETT SPRING & AXLE COMPANY

Spring and Forge Plant, Monongahela, Pa. General Office, Pittsburgh, Pa. Auto Parts Plant, Cleveland, O.

QUICK DELIVERIES

STYLE F. A. 2060

Front and Rear Axles Complete with Roller Bearings **Springs—High Carbon or Alloy Steels**

How *you* can sell more Accessories

Novel, convenient rubber accessories—not included in any other line—are fully explained in this Free Illustrated Catalog. Motorists pronounce Essex Rubber Accessories a necessity—and Essex Advertising means new customers, bigger sales and more money for you.

The Essex Line of Motor Accessories

and the Essex Policy of selling only through dealers insures your profits absolutely. Ask your Jobber or write us today, mentioning his name. We will send you this profitable book free with the name of the nearest jobber who can supply you.

Contains full data about the most profitable line of rubber accessories, including the Essex Tire Interliner, Asbestos Brake Lining, Asbestos Gas Engine Packing, Generator Tubing, Rubber Goggles, Rubber Bumpers, Pyramid Matting, Inside Blow-Out Patches, Tire Plasters, Outside Hook-On Boots, Outside Laced Boots, C. I. Pump Tubing, etc.,—all big, quick-selling money makers.

ESSEX RUBBER COMPANY, Inc.

PRINCIPAL OFFICE and FACTORY
TRENTON, N. J.

258 Broadway, New York
58 Lincoln Street, Boston

Motorists:

If your Accessory Dealer does not sell Essex Specialties, write us for full information and the name of a dealer who will supply you.

USL

(Formerly National)

STORAGE BATTERY

It's Power That Counts

Some electrics are limited to short, easy runs because they are not powerful enough to venture where the going is hard. In such cases the storage batteries are of the ordinary type that falls down when the power requirements are heavy.

The **U-S-L** Battery extends the utility of an electric beyond the smooth, hard, level roads. It is lively, responsive and powerful regardless of how steep the hills or how deep the sand, mud or snow. When the trip is long and hard, the **U-S-L** Battery will bring the car spinning in still strong at the finish.

U-S-L Batteries are built in the largest and best equipped plant of its kind in the world. Every pound of raw material is analyzed before its use is permitted. Every battery is thoroughly tested and inspected before shipment. We build U-S-L Batteries right, and that's the reason for the exceptional service they give.

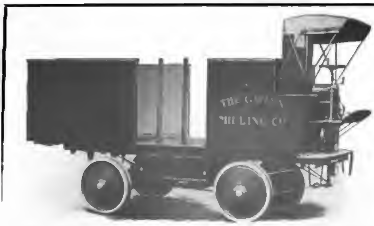
The U. S. Light & Heating Co.

General Offices: 30 Church St., New York

Factory: Niagara Falls, N. Y.

BRANCH OFFICES & SERVICE STATIONS

New York Boston Buffalo Cleveland Detroit
St. Louis Chicago San Francisco



Capacities, 3 to 10 Tons

***Front* and *Four* Wheel Drive**

Battery and Gas-Electric types

Let us serve you with literature and information that will help you to solve your hauling problems.

Couple-Gear Freight-Wheel Co.

540 Buchanan St. Grand Rapids, Mich.

New Trade Price List, October 15, 1912

German Chrome Steel Balls

J. S. BRETZ COMPANY
SOLE IMPORTERS
F & S Ball Bearings
250 West Fifty fourth, New York

THESE balls are of extreme accuracy, both as to size and sphericity, and are of high finish. They are the product of the largest Steel Ball plant in Continental Europe.

The grade of Balls which we import is that employed exclusively by Fichtel & Sachs in their well-known and established product known as the "F. & S. Annular Ball Bearings."

We particularly call attention to the fact that the steel balls which we import are made of the finest chrome steel, and that the great ball making plant we represent is equipped with the latest and best of modern machinery for turning out steel balls, producing only the finest, and that today none in the industry can compete with this plant in either quality or quantity production.

During a score of years, the twenty years of time in which the plant has been thoroughly established, it has always been its aim to produce the best output possible, to make balls of superior hardness and extreme accuracy, and of the finest polish and finish, and that it has reached the highest possible point in this respect is evident from the fact that the best and greatest ball bearing makers all over the world use and recommend its steel balls; and these ball bearing makers have for many years been steady customers, taking nearly the whole of the big output.

We also call your attention to the fact that this already large and exclusively ball making plant has just been greatly enlarged, so that we are now more able than ever to guarantee prompt deliveries at all times.

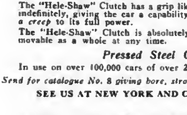
U. S. Ball Bearings

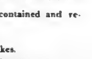
THE STANDARD BEARING
FOR EVERY CAR

Perfect
Accurate
and
Durable

U. S. BALL BEARING MFG. CO.
Denton & Flagg, Direct Reps.
Cleveland Chicago Detroit

THE *EVANS'* MODEL
HELE-SHAW CLUTCH
(*Patented*)
Is Standard of the World on high grade cars, in America and Europe





Cross section of plate grooves.

The cut shows details of wedge-shaped annular grooved plates used in "Hele-Shaw" Clutch. They combine the best of the cone and disc principles.

The "Hele-Shaw" Clutch has a grip like a vise, but is slippable indefinitely, giving the car a capability of speed *ranging from a creep* to its full power.

The "Hele-Shaw" Clutch is absolutely self-contained and removable as a whole at any time.

Pressed Steel Case

In use on over 100,000 cars of over 250 makes.

Send for catalogue No. 8 giving bore, stroke and number of cylinders

SEE US AT NEW YORK AND CHICAGO SHOWS

MERCHANT & EVANS COMPANY
The Premier Metal House in America
M & E Co.
PHILADELPHIA
New York Brooklyn Chicago Kansas City
Baltimore Wheeling Cleveland Denver

Gurney Ball Bearings

Sustain greater loads and outwear all others, WHY? Because they have raceways of more perfect contour than all others.

Will take greater thrust load because they have full depth and uninterrupted raceways with full complement of balls.

Our Radio-Thrust Bearings will sustain 100% radial or 100% thrust load or a combined radial and thrust load.

Something new and valuable. Write for particulars.

GURNEY BALL BEARING COMPANY
JAMESTOWN, NEW YORK

Your Truck Needs Motz Cushion Tires

for these reasons:—

1st—because they save power. They will carry your truck more miles on a given fuel charge than any other tire.

2nd—they will protect the delicate, mechanical parts of your truck **just the same as properly inflated pneumatic tires.**

3rd—they will save you time, for they never puncture or blow out—and they are easily applied to any standard clincher, universal quick detachable or demountable rim.

4th—you will get more tire mileage. Motz Cushion Tires are guaranteed for 10,000 miles—one year.

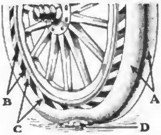
5th—dangerous skidding will be done away with.

Note the special, patented features which give the Motz Cushion Tire its remarkable shock-absorbing qualities. Note A, the double treads; B, the undercut sides; C, the slantwise bridges; D, shock-absorbing quality, as shown when passing over an obstruction.

Write us the make and model of your truck and the size of your rims and we will give you more definite tire facts of value to truck owners.

Ask for Booklet 66.

The Motz Tire & Rubber Company



Factories and Executive Offices
AKRON, OHIO

Branches:

1737 Broadway, New York. 2023 Michigan Ave., Chicago. 4 Dundee St., Boston, Mass. 999 Woodward Ave., Detroit. 1932 Euclid Ave., Cleveland. 300 N. Craig St., Pittsburgh, Pa. 409 East 15th St., Kansas City, Mo. 1400 Race St., Philadelphia. 336 W. Pico St., Los Angeles.

Hess-Bright Ball Bearings

Most durable for motor trucks.

Set of Data Sheets sent free of charge to any automobile engineer on request. Write on the stationery of your Company.

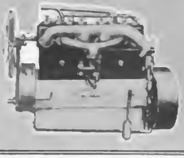
The Hess-Bright Manufacturing Co.
21 East Erie Ave., Philadelphia, Pa.

MAKE your guarantee of truck efficiency mean what it says. The truck equipped with the Waukesha Long Stroke Truck Motor fulfils every promise your guarantee makes—because it's a motor with unlimited capacity for hard work—because its strength combats abuse and carelessness and keeps down the upkeep expense to the minimum—because it consumes less fuel than any other motor and because it's strictly a *truck motor*.

The Waukesha possesses strength to a most unusual degree. The crankshaft is of double-heat treated nickel chrome steel, with tensile strength of [illegible] tons. That metal is exclusively our own process. So, too, is the metal from which the Waukesha bearings are made—they have

WAUKESHA

4¼×6¾" LONG STROKE TRUCK MOTOR



greater resistance than Parson's White Brass. The construction of the motor as a whole has the comparative strength of these two parts.

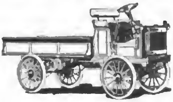
The truth regarding the Waukesha Motor makes fascinating reading for the truck manufacturer. Ask us.

WAUKESHA MOTOR CO., Dept. C. Waukesha, Wisconsin

Sanford

Unfortunately there is but one competitor to Sanford Trucks

Chassis $1600



Stake or Express Body $1750

We're sorry about this in a way, for it narrows down our possible comparisons. But it makes it pretty easy for our representatives. There never has been a selling proposition in the field that can compare with the Sanford.

Nine long years' work on a one-ton truck gives you today this proposition, the success of which there is no gainsaying. There isn't a thing about this truck that's strange or freakish. Its success is not remarkable because of anything unusual.

The Sanford truck is remarkable only because it is so certain to do more than you'll claim for it that your repeat orders will be more or less automatic.

The Sanford Motor Truck Co.
SYRACUSE Wolf St. NEW YORK

Adams Trucks
"Deliver the Goods"

AGENTS—1913 is going to be a record year in the motor truck field. The agent affiliating himself at this time with a good standard truck is going to reap the cream of the business in his locality. The ADAMS offers you these possibilities. Don't put this off another day, but write us at once for details. Our output for next year is nearly all contracted for—so act at once.

THE ADAMS BROS. CO.
FINDLAY OHIO

FOR LOW UPKEEP EXPENSE GET AVERY TRUCKS

Avery trucks are everywhere gaining the reputation of doing the most work at the minimum cost of upkeep.

The Geo. W. Travers' three-ton type "A" Truck of Hoboken, N. J., has been putting in a good big hard day's work every day for eight months and not one cent has been spent for repairs. This is only one of the many good records made by Avery Trucks.

That is one reason why we call the

AVERY

"The Truck that Does the Most Work."

You will be interested in our line of trucks, for we are now building two types in 2, 3 and 5 ton sizes, and everyone is a winner.

They haul full capacity and overloads on their own body. Full [illegible] behind [illegible] can be equipped with either hard rubber tires or cast steel rim wheels.

Write for our New Truck Booklets and get all the Facts about these trucks before you make any contracts. Address

AVERY COMPANY
951 Iowa St. Peoria, Ill.

Schafer Ball Bearings

"Famous for their Durability"

Radial or Annular Bearings for radial load only.

Axial or Thrust Bearings for axial load only.

Diagonal or Combination Bearings for diagonal or combined axial and radial load.

There is a size and type of Schafer Bearing for every bearing service.

Write for catalog.

Barthel, Daly & Miller

Sole Importers

42 Broadway New York

Standard drive as used by "Coventry-Simplex."

FOR CAMSHAFT, MAGNETO AND PUMP EFFICIENCY, INVESTIGATE THE CLAIMS OF THE RELIABLE AND SILENT

COVENTRY *NOISELESS* CHAINS

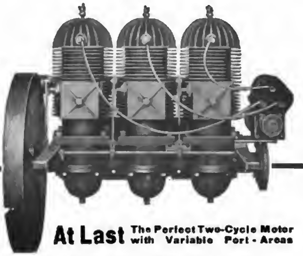
—POSITIVE AND FLEXIBLE, THESE CHAINS RUN WITH REMARKABLE ACCURACY AND PRECISION. SUCH IS EVIDENCED BY THE FACT THAT THEY HAVE BEEN ADOPTED AS STANDARD EQUIPMENT ON THE FOLLOWING CARS—DAIMLER, BENZ, MERCEDES, ROLLS-ROYCE, MINERVA, DE DION, BOUTON, DARRACQ, ETC., ETC.

WHY NOT INVESTIGATE?

U. S. REPRESENTATIVES

Sarco Engineering Company

112 Broad St., N. Y.



At Last The Perfect Two-Cycle Motor with Variable Port-Areas

The essential feature of Moore Motors is the increasing or decreasing of all the port-areas simultaneously (fully patented), giving flexibility of control and fuel economy.

(Fixed ports, as in regular two-cycle design, mean lack of flexibility and high fuel consumption.)

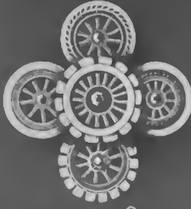
The result is a power plant combining two-cycle simplicity and low upkeep cost, with four-cycle flexibility of control and fuel economy.

Moore Motors are backed by years of engineering experience. Send for descriptive circular.

Palmer-Moore Company

SYRACUSE - NEW YORK

Makers of Wheels for America's Leading Trucks



PHINEAS JONES & COMPANY

305 Market St. Newark, N.J.

Branch Factory 12th Ave & 55th St., N.Y

N Stegeman N

Selected Because of its Greater Merit

30% of our sales are Repeat Orders

DEALERS—NOTE

There's more profit in handling a line that's recognized for its **quality**. Easier sales and their **certain** repeat orders will build up your business. Demonstrations will quickly reveal Stegeman superiority in **your** territory.

Some Features—Enclosed chains—**quiet** operation—left hand drive—ball bearings—springs and axles guaranteed for life—unit power plant—light and simple chassis—pressed steel frames. *Line of 1500 lbs. to 4 tons capacity.*

Our Specifications and Proposition Will Interest Hustlers—Write us.

Stegeman Motor Car Co., Woodward Ave. Milwaukee, Wis.

Stewart
Delivery Cars

UNITED DELIVERY CO.

PANEL BODY—Capacity 1500 Pounds

Read What These Dealers Say of Stewart Delivery Trucks

Live dealers everywhere are finding Stewart Trucks ready sellers and big money makers. Read what they say of these spendid cars.

Our demonstrator received; more than meets our expectations.—Henry E. Riker & Co., Cleveland, Ohio.

We congratulate you, first, upon the fine mechanical construction of the car, and second, on its fine appearance and finish. The car is all you claim, and more.—Northrup Motor Service Co., Edmonton, Alberta.

The cars came through O. K. and run and look above our expectations.—Borg & Wharry Motor Co., St. Paul.

Our demonstrator attracts attention everywhere. It looks more than good to us and we expect to make a lot of money selling Stewart delivery trucks.—Crim Bronner Auto Co., Utica, N. Y.

Fisk, the confectioner, is highly delighted with his panel car. It has abundant power and takes the big hills in Baltimore on high gear. We already have a number of excellent prospects lined up.—H. Stuart Beaver, Baltimore.

Our two demonstrators are creating considerable interest. They are quiet as a limousine and very powerful. We hope to sell more than the hundred we have contracted for.—Gomery-Schwartz Motor Car Co., Philadelphia.

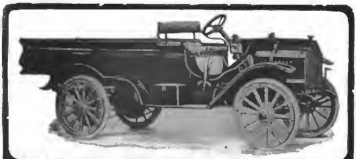
Some Stewart features: 30 h.p. Continental motor, Brown-Lipe selective transmission, demountable rims, left hand steering, center control, wheel base, 126"; large loading space, complications eliminated. Chassis, $1650.

Send for our dealership proposition at once.

Separate from and having no connection with the Lippard Stewart Motor Car Co.

Stewart Motor Corporation, Buffalo, N.Y.

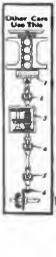
T. R. Lippard, Pres. & Gen. Mgr.
R. P. Lentz, Sec. & Treas.
R. G. Stewart, Vice-Pres. & Chief Eng.
R. W. Ingersoll, Sales Mgr.



THE LAMBERT MOTOR TRUCK

The first investment is not the most important consideration in the purchase of a motor truck. It is important that you study the construction—what will it cost you in time and money to get like results from different types of cars?

Other Cars Use This



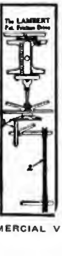
The Lambert Patented Friction Drive will give you more service at less expense than any truck built. This is apparent by studying the illustrations in this advertisement. That on the left shows the usual form of power transmission. That on the right the **Lambert Patented Friction Drive.** Six expensive complicated units, as compared to two simple components. Granted that the results from the gear transmission are equal to the friction, which is the more economical? The cost of lubricating oil alone in the one on the left, will amount to more than the replacement of parts on the **Lambert Friction Drive.**

The Lambert is trouble proof, and cannot be damaged by carelessness or inexperience. It overcomes the chief objection to commercial cars.

We have prepared some very interesting literature for you. A card brings it to you.

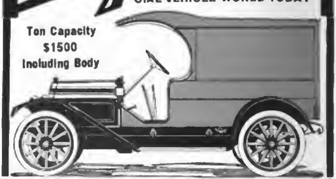
The Buckeye Manufacturing Co.
146 Columbus Avenue
ANDERSON, INDIANA

The LAMBERT Pat. Friction Drive



Nyberg

BIGGEST VALUE IN COMMERCIAL VEHICLE WORLD TODAY



Ton Capacity
$1500
Including Body

DEALERS Just imagine the possibilities—two great models, "35" and "38." 1,500 and 2,000 pounds capacity. $1300 and $1500, including body, in Nyberg Grey or Packard Blue

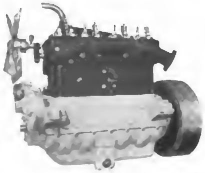
WE WANT GOOD AGENTS IN EVERY PART OF THE COUNTRY

NYBERG AUTOMOBILE WORKS, Anderson, Indiana

CHICAGO OFFICE
2437 Michigan Ave.

Will Exhibit at the Chicago Show

CONTINENTAL
COMMERCIAL MOTOR
The Mark of a Good Truck



The new heavy duty Continental—one ton and seven ton capacity—carries all the approved improvements:—Long stroke; large valves; heavy bearings; enclosed valve mechanism; perfect lubricating system.

Unit power plant or independent motor.

The Continental's reputation for reliability, for power, for economy and efficiency, have made it the mark of a good truck.

Write for specifications, prices and terms.

CONTINENTAL MOTOR MFG. CO.
DETROIT, MICH.

Factory Representative
K. F. PETERSON, 122 S. Michigan Blvd., Chicago, Ill.

Bosch Plugs

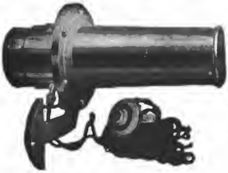
As good as : :
Bosch Magnetos

$1. FROM YOUR DEALER OR WRITE DIRECT TO **$1.**

Bosch Magneto Company
223-225 West 46th Street **New York**
Detroit **Chicago** **San Francisco** **Toronto**

NEWTONE

The Mile Away Electric
MOTOR HORN



Torpedo Type
Pat. Sept. 5, 1911
PRICE
$20.00
Including Button and Cable

The Most Perfect Warning Device on the Market

The increased demand for the Newtone Motor Horn is due to its absolute efficiency in warning, and economy in operation.

The motor with Hess-Bright Ball Bearings and imported self-lubricating brushes, eliminate all oiling and cleaning.

The chief engineers of three leading American automobile manufacturers, after a "Break-Down" test, state that, in their opinion, the Newtone Horn is the BEST warning signal made

LET US SEND ONE ON APPROVAL

Automobile Supply Mfg. Co.
220 Taaffe Place, Near Dekalb Ave. **Brooklyn**

Detroit Oilers have no ball checks

There are no check valves or other complicated parts in Detroit Mechanical Force Feed Oilers to give trouble and cause failures. Every drop of oil *must* go to the place where it is needed.

A separate pump for each feed measures the oil and insures a rate of feed that is *exactly* right at all times. Once properly regulated there is no chance for faulty lubrication and dry bearings, carbonized cylinders, smoke at the exhaust and wasted oil are entirely eliminated.

Detroit Oilers are made with from one to thirty feeds in capacities of two pints to five gallons—pulley, sprocket, ratchet or gear drive.

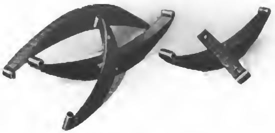
Made also with two compartments for feeding one kind of oil to cylinders and another to the bearings.

Write today for catalog P-66 and full information.

DETROIT LUBRICATOR COMPANY.
DETROIT, U. S. A.

Largest manufacturers of lubricating devices in the world.

"Reliable Springs are More Important on Commercial Cars than on Pleasure Cars."



THE PERFECTION SPRING CO.
Cleveland - - - - - - Ohio

Remy Magneto

Exchange Your Old Magneto for a New Remy

IT will cost you practically no more than what you will be forced to pay out for constant repairs on your present ignition system. A new Remy will give your car new life. Here is our exchange proposition:

	List Price	Allowance	Net to You
2-Cylinder Remy Magneto with Coil, complete	$46 00	$9.20	$36 80
4-Cylinder Remy Magneto with Coil, complete	50 00	10 00	40 00
6-Cylinder Remy Magneto with Coil, complete	52 00	10 40	41 60

Allowance made for any make of Magneto.

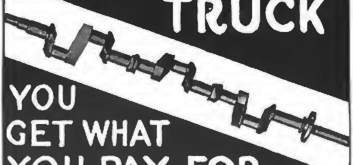
REMY ELECTRIC COMPANY
ANDERSON, INDIANA

BRANCHES—New York, Boston, Detroit, Chicago, Kansas City, San Francisco, Indianapolis.

SERVICE STATIONS—Albuquerque, Augusta, Baltimore, Charlotte, Cincinnati, Cleveland, Denver, Dallas, El Paso, Houston, Jacksonville, Louisville, Memphis, Minneapolis, New Orleans, Nashville, Norfolk (Va.), Omaha, Los Angeles, Philadelphia, Pittsburg, Portland (Me.), Portland (Ore.), Rochester, San Antonio, Seattle, Spokane, St. Louis, Syracuse, Utica, Washington (D. C.).

CANADA—Toronto, Winnipeg, Calgary, Hamilton, Vancouver, Montreal.

CRANKSHAFTS CAN'T BE TOO GOOD IN A TRUCK

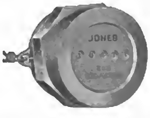


YOU GET WHAT YOU PAY FOR

GET THE BEST—THEN REST

STANDARD GAUGE STEEL CO.
BEAVER FALLS, PA.

This Hub-Odometer



Is a strong, substantial instrument. Made by JONES the Speedometer man. The material is the best. The workmanship the most efficient. No cheap stampings, no soft metals, no danger of inaccuracy. The JONES Hub-Odometer fits any standard truck. As strong as the hub itself.

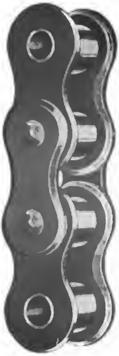
Write for Particulars

THE JONES SPEEDOMETER
Main Office—Bush Terminal, New York

Baldwin Chains and Sprockets Run Well Together

Made in the same factory with the most complete equipment, backed by years of experience by an organization trained in the art. We solicit an opportunity to send samples of chain and to quote on your sprocket requirements. We have the capacity to handle them in any quantity and at interesting prices.

We make a specialty of furnishing sprockets for replacement on standard commercial cars.



Baldwin Chain & Mfg. Co.

WORCESTER, MASS.

AGENTS

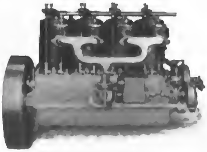
H. V. GREENWOOD.....122 So. Michigan Blvd., Chicago, Ill.
C. J. IVEN..............................Rochester, N. Y.
M. A. BRYTE.........788 Mission Street, San Francisco, Cal.
CHAS. D. SCHMIDT..........416 Broadway, New York City
F. SHIRLEY BOYD......893 Boylston Street, Boston, Mass.

POWER

A Reputation "MODEL" MOTORS Enjoy All Over the World

Put a Model Power Plant In That Old Truck of Yours and Your Troubles Are Over

A Model Power Plant In Your New Cars or Trucks Insures Your Reputation for Life.



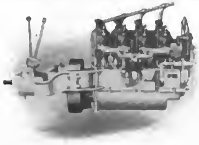
Unit Power Plants

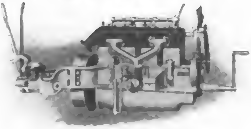
3 Point Suspension—Immediate Accessibility

Automatic Throttle Governors

Most Efficient, Powerful and Economical Equipment Money Can Buy. 68 Types of Motors for LOCOMOTIVE, TRACTION, LIGHT & POWER, IRRIGATION, MINING, Etc.

Write Today for Full Information Free



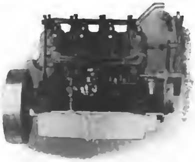


Sizes of Separate Units

4	cylinder,	3½	x	4½	4	cylinder,	4½	x	6
4	"	4	x	5	4	"	5	x	5½
4	"	4¼	x	5	4	"	5	x	6
4	"	4½	x	5½	4	"	6	x	6
4	"	4½	x	5½	4	"	6½	x	8

Model Gas Eng. Works

PERU, IND. LB. 2001



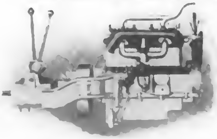
Transmissions and Clutches

Four and Five Speed Transmissions Especially Adapted for Heavy Duty Trucks.

WELL'S DRY PLATE CLUTCH

Only absolute dry plate clutch in the country backed by a guarantee, fool proof and practical.

Write Today for Full Information Free



PLEASE MENTION THE COMMERCIAL VEHICLE WHEN WRITING TO ADVERTISERS.

The PROOF of the Tire is in the RepEATING

Springfield, O., July 23, 1912.

THE VICTOR RUBBER CO., Springfield, O.
Gentlemen:—

Please apply four (4) 36 x 4 Victor Sectional Truck Tires on the rear wheels of our three-ton Kelly truck.

The set we have just worn out were applied on October 20th, 1911, and in the past nine months have given us very satisfactory service, especially in view of the large mileage and severe usage our truck receives. During the time they have been in use they have never been touched for repair or adjustment.

About 80% of our mileage is country work on trips varying from twenty to one hundred and fifty miles, where the trips are over rough roads, and frozen roads in winter time. We have used other tires under the same conditions and were never able to get one-half as much service from them as from this set of Victor Sectional. The Victor Sectional has better traction than the endless tires, and during the heavy snows of the past winter we did not find it necessary to use wheel chains, and had no trouble whatsoever from either slipping or skidding

Yours very truly,
WAGNER TRANSFER & STORAGE CO.
RW/MMF (Signed) By RAY WAGNER.

VICTOR SECTIONAL TRUCK TIRES are especially adapted for general haulage companies using trucks making long trips to points far removed from service stations. The simplicity of the fastening permits the removal of a block, right on the road, in a few minutes, without even jacking up the wheel.

S. A. E. Standard—Write for Booklet and Prices

THE VICTOR RUBBER COMPANY, Springfield, Ohio

Why FEDDERS RADIATORS are used on the Best Trucks

FEDDERS RADIATORS are used on the best trucks and cars because—

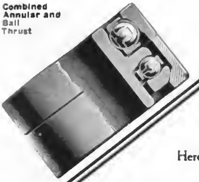
First—Every individual tube is completely surrounded by water, and the water passages are not obstructed.

Second—If a FEDDERS RADIATOR is accidentally damaged, it can be repaired by any practical man. You don't have to send the whole radiator to a far off factory, when one tube is out of order.

Third—They are made of copper, the best heat conductor among the baser metals.

Write for our catalogue to-day

FEDDERS MFG. CO., Buffalo, N. Y.



Combined Annular and Ball Thrust

Study These Combinations

You know the difficulty of getting—and keeping—just the right adjustments in separate annular and thrust bearings on a shaft. It's all guesswork—"feel"; and in nine cases out of ten, something is either too tight or too loose.

Here are two combination bearings that will at once eliminate all this trouble, because **all necessary adjustments have been made in the bearing and it cannot go wrong.** These are

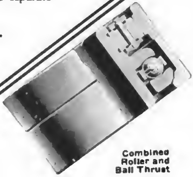
NORMA BEARINGS

Combined Annular and Ball Thrust, and Combined Roller and Ball Thrust—self-contained, self-adjusting, heavy-duty bearings, mechanically **right**—that take the place of two separate bearings otherwise needed.

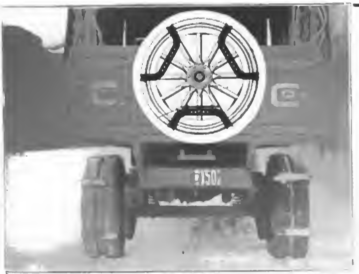
You **save** in the time and labor of mounting. You know your adjustments are **just right.** You **know** you are getting the best efficiency. You **protect yourself** from trouble.

These are only two examples of the results of Norma Specialization. Other examples are shown in our Bulletins. Shall we send them?

The Norma Company
of America
22 Vesey Street NEW YORK



Combined Roller and Ball Thrust



Lyon Grips in Service

Never Mind the Mud Holes

You won't have to keep an emergency truck busy after a December snow and thaw if you equip each of your trucks with a pair of

Lyon Solid-Tire Grips

They are put on or off in a few moments; in snow or on muddy roads you leave them on all day, or a week, or a month, if necessary.

They supply the "bite" when the going is at its worst. They last, in ordinary use, a couple of seasons or longer. They cannot injure the tires, and they do not impair the tire makers' guarantee.

Lyon Grips are a scientific solution of the solid tire traction problem. Our catalog tells all about them.

We guarantee Lyon Grips, when applied as directed, for 2500 miles.

LYON NON-SKID COMPANY, 429 N. Broad St., Philadelphia, Pa.

THESE SPOKES INTERLOCK AND FORM AN IMMOVABLE CENTER ASSEMBLAGE

Schwarz Wheels

STANDARD EQUIPMENT FOR AMERICA'S LEADING TRUCKS

If you must economize on your truck equipment, let it be on some other part than the wheels. Every manufacturer knows that the wheels of his trucks are but burden bearers and flaws in their construction inevitably lead to large repair bills and inefficient delivery.

SCHWARZ WHEELS are the Strongest, Safest, and Most Economical, because their interlocking spokes form a tight center, which cannot loosen or work out of true. No other wheel is made with this protection.

Let us consult with you on design and proportions.

THE SCHWARZ WHEEL COMPANY
FRANKFORD, PHILADELPHIA, PA.

ELECTRIC VEHICLE OWNER OR GARAGE

WE SAVE YOU MONEY!

Manager

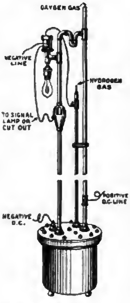
Your truck batteries require lead burning. You now use Hydrogen gas for the purpose. **You are paying out money for zinc and acid to make it.**

You are wasting electricity while charging your vehicles.

The use of our generator saves you this money and converts the waste electricity into Hydrogen and Oxygen gases for welding.

A considerable labor cost is also saved.

ASK YOUR BATTERY MAN



Garage Superintendent

You know that the hydrogen gas process by zinc and acid is troublesome to maintain. Generator must be cleaned out at frequent intervals, it lays down when you need it most, acid and zinc must be supplied to it.

The electricity now wasted in rheostats is passed through our apparatus and decomposes water into Hydrogen and Oxygen gases. This gas is hotter than that made with acid and zinc, hence does quicker work. It is always on tap, needs no cleaning. Water is all you have to supply to it.

Write to us for proposition and mention this paper. State number of hours burning per day and number of blow pipes used

THE ELECTRIC STORAGE BATTERY & MFG. CO., Cincinnati, O.

The Stop Watch Method.

Applying science to delivery—better routing—faster loading and unloading—reducing idle time—require more accurate information than ever before. The modern delivery manager needs and demands "machine control" of his service. Ordinary methods of checking, which depend on human accuracy for success, are as antiquated as the spinning wheel or the tallow candle.

Only by a never-failing, tamper-proof recording device can the business man obtain positive knowledge of any unauthorized use of his vehicles; exact start and stop of the day's work; actual running time of each vehicle: length of time required to load and unload; efficiency and reliability of drivers: actual efficiency of each vehicle, and other valuable information, without which there will be costly leaks in this department.

The Servis Recorder

is the most reliable, simple and accurate recording device on the market. It has no flexible shaft gears or outside connections—hence has none of the trouble and inaccuracy arising from their use.

It works equally well on horse vehicles, motor trucks, bob-sleds and switching locomotives. Its record cannot be "faked" or altered, but can be read at a glance.

This remarkable device is saving money for concerns in more than twenty-six lines of business, with every kind of delivery problem, and for over twenty railroads.

It will help you save money, and supervise your delivery at low cost. No matter what your problem is, or how efficient your present system of checking may be, it will pay you to investigate. For description, names of owners, etc., address:

The Service Recorder Co.

2350 East 105th Street
Cleveland, Ohio

Branches in twelve cities

EISEMANN

No other ignition systems have solved the problem of commercial car ignition as well as the Eisemann systems with Automatic Spark Control Magnetos.

The Automatic Spark Control takes the question of properly timing the magneto away from the element of human guess-work and automatically places it, as it should be placed, dependent entirely upon the operation of the engine.

In other words, with the Automatic Spark Control on a magneto the advancing and retarding is done as it should be done, mechanically-and-automatically-right, instead of by guess-work, or not at all, as is the case when the magneto control is in the hands of the truck driver.

The Eisemann Magneto with Automatic Spark Control makes hills like level roads—it is in the performance of hill climbing that this wonderful Eisemann product shows to greatest advantage, by reducing the necessity of gear shifting to the absolute minimum.

It's a mighty interesting story we have to tell about the Eisemann Magneto with Automatic Spark Control.

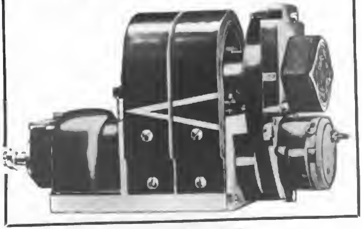
Send to us for information.

The Eisemann Magneto Co.

Sales and General Offices:
225-227 West 57th Street, New York

Indianapolis
514 North Capitol Ave.

Detroit
6 Goldberg Building



Once Again the Zenith Proves Its Reliability

ZENITH

CARBURETOR

In the recent automobile rally at San Sebastian, Spain—the only big touring event of the year—the Zenith Carburetor was the bright particular star, winning in both classes.

It brought a Gregoire car 1470 miles from Posen, Poland, to San Sebastian, carrying eleven persons—a total load of three tons—winning first prize in Class A.

It brought a Metalligique car 2225 miles from St. Petersburg, winning first prize in Class B.

Thus the Zenith proved again its reliability in touring and in power and speed qualities.

When you get Zenith carburetion on your car you get standard carburetion.

ZENITH CARBURETOR CO.

276 Jefferson Ave. Detroit, Michigan

FEDERAL GRIPS

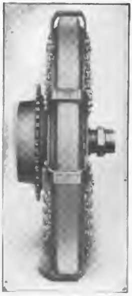
are designed and made expressly for solid tires—the more severe the conditions, the greater their merit stands out.

FEDERAL Grips are time savers, being quick attachable in every sense of the word. Jack or special tools not required in application of grips—your hands and two minutes are needed—that's all.

FEDERAL Grips fold up in a very compact form when not in use—they can be conveniently carried on the car, ready for any emergency.

FEDERAL Grips are made from NICKEL STEEL exclusively, the steel being heat-treated in the most approved manner, making it capable of withstanding more than the ordinary amount of accidental or customary hard usage.

FEDERAL Grips will do the work—not injure the tires—and are mechanically perfect—our guarantee that goes with every set covers that.



As the LARGEST makers of Traction Grips for Solid Tires in the United States, we are justified in stating that our grips *must* be the best, our methods *must* reflect honesty and fair dealing, and our prices *must* represent true economy to the users.

"Points about Traction Grips and their selection" are covered in our catalog—YOUR copy is ready—it's free.

We also manufacture GAYLOR Grips for Solid Tires.

Federal Chain & Manufacturing Company
SPRINGFIELD, MASS.

Three Things
Make

Swinehart

Cellular Truck Tires
DEMOUNTABLE, Quick Attachable
Preferable for Truck Equipment

Non-Skid

The non-skid cellular tread increases the traction and eliminates undesirable slipping and friction, which always cause excessive wearing of the tire's surface.

It eliminates the necessity for chains.

Non-Heating

The holes in the tire act as a radiator, preventing excessive heating and internal friction.

The extra large surface of the Swinehart tread reduces the pressure per square inch to a point well within the safe and economical limit.

Resiliency

The wonderful elasticity, due to the combined use of our cellular design and the highest grade of rubber, allowing the tire to "give and take," to stand the road shocks without damage, is the true secret of Swinehart tire longevity.

In the hands of hundreds of owners Swinehart Cellular Truck Tires, due to their non-skid, non-heating resilient features, show phenomenal results in mileage.

Let us show you actual records and explain in detail the construction of this cellular type.

We also make a full line of smooth tread single and dual solids—Demountable Quick Attachable Tires.

Branches and dealers in all principal cities.

The Swinehart
Tire & Rubber Co.
1201 NORTH STREET
AKRON, OHIO

WESTON MOTT CO

WE'LL MEET YOU AT THE SHOW

There'll be a mighty big display of everything pertaining to motor vehicles at the New York exhibition but in all that vast concourse of completed cars and accessories there will be nothing to surpass our Premier Products. In the manufacture of automobile

Axles
Hubs
Rims

we lead the world and our thirty years' experience makes us masters of the market.

We want you to be as particular in buying as we are in selling.

Test every other make of axle, hub and rim on the market, then come and test ours—give ours even a more severe one than the rest.

You'll choose ours because they're right and are built to stand up. At our five big factories in

FLINT, MICH.,

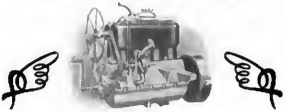
you'll find us shipping every day carload after carload, but every single piece has to pass our rigid inspection before it goes out.

WESTON MOTT CO

Here's a Portrait of Your Best Salesman,

Mr. Truck Manufacturer, and Mr. Truck Dealer

BUDA MOTOR



It is also a picture of Mr. Owner's "Best Buy."

The day of selling or buying a Truck on general specifications has passed. Owners have learned to ask pertinent questions. They are beginning to look the mechanical horse in the mouth. They are beginning to realize that what they are really buying is generally buried out of sight, beneath the hood—THE MOTOR—*the heart of every truck.* For that reason the wise Manufacturer or Dealer in closing a sale never forgets to tell his prospect that his machine has a

BUDA MOTOR

BENEATH THE HOOD.

When you come down to it the reason some of the ***prominent, successful*** and ***alert*** Truck Manufacturers are specifying the BUDA is for no sentimental reasons, but

—because the *Dealers* are specifying the BUDA in their orders;

—because the *Public* is *insisting* on the BUDA;

—because the *Public* appreciates;

- —BUDA demonstrated powerfulness in thousands of trucks now in daily use on heavy and light duty work.
- —BUDA special oiling device.
- —BUDA superior "get-at-ableness".
- —and the restful satisfaction in knowing that in case of accidents interchangeable parts can *always* be secured from a company which has been in business for 25 years and has no thoughts of quitting

Remember it was the BUDA which was the Pioneer in the "Cast-in-block" method in U. S.

1913 Specifications

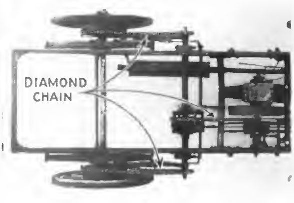
for Hyduty Commercial Motors

Model "M" Motor, $3\frac{3}{4} \times 4\frac{1}{2}$
Model "Q" Motor, $3\frac{3}{4} \times 5\frac{1}{2}$

Longstroke. Enclosed valves. Noiseless timing gears. Selfcontained oiling system. Extra large valves and bearings. Ample water jacket.

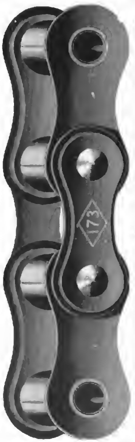
BRANDENBURG & COMPANY

1108 So. Michigan Ave. Chicago
57th & Broadway New York City
Ford Bldg. Detroit



DIAMOND CHAIN SATISFACTION

For many years the Reo Motor Car Co. have been constant large users of Diamond Chains, and now Diamond Chains are used as standard equipment on all their commercial vehicles.



In manufacturing Diamond Chains the closest attention is given to combining in material and construction those essential qualities which have made our chains so satisfactory on Reo cars—great strength and durability.

Our treatise "Power Chains and Sprockets" contains interesting and valuable information on the subject of chain drive for Trucks.

Write for free copy

LOOK FOR THE

TRADE ◇ MARK

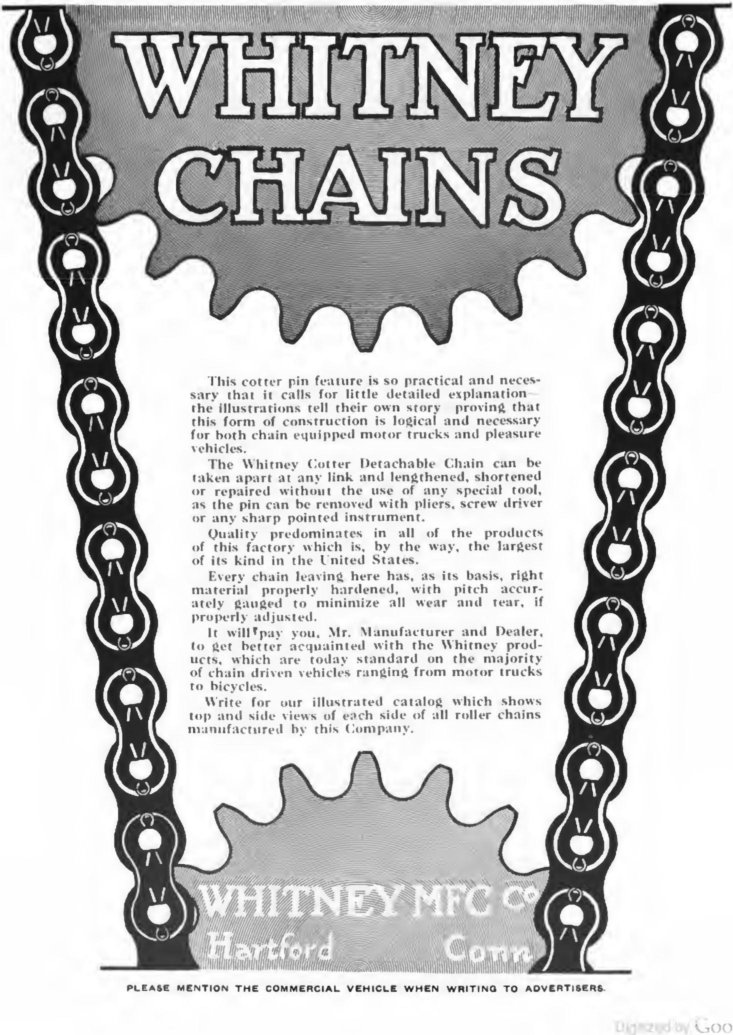
Diamond Chain & Mfg. Co.

257 W. Georgia St., Indianapolis, Ind.

CAPACITY 8,000,000 FEET PER YEAR

SAMPLES SUBMITTED

(136)



This cotter pin feature is so practical and necessary that it calls for little detailed explanation—the illustrations tell their own story proving that this form of construction is logical and necessary for both chain equipped motor trucks and pleasure vehicles.

The Whitney Cotter Detachable Chain can be taken apart at any link and lengthened, shortened or repaired without the use of any special tool, as the pin can be removed with pliers, screw driver or any sharp pointed instrument.

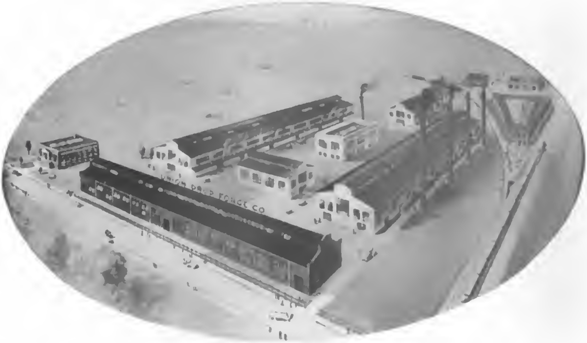
Quality predominates in all of the products of this factory which is, by the way, the largest of its kind in the United States.

Every chain leaving here has, as its basis, right material properly hardened, with pitch accurately gauged to minimize all wear and tear, if properly adjusted.

It will pay you, Mr. Manufacturer and Dealer, to get better acquainted with the Whitney products, which are today standard on the majority of chain driven vehicles ranging from motor trucks to bicycles.

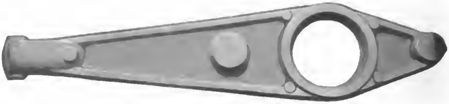
Write for our illustrated catalog which shows top and side views of each side of all roller chains manufactured by this Company.

Weight, 175 lbs., Drop Forged



NORTH WORKS

Weight, 225 lbs., Drop Forged



Weight, 55 lbs., Drop Forged

UNION DROP FORGE CO.

Main Office, 358-360 W. Indiana Street

Forge Works, 347 W. Ohio St. **CHICAGO, ILLS.** North Works, Grand and 44th Av

PLEASE MENTION THE COMMERCIAL VEHICLE WHEN WRITING TO ADVERTISERS.

TIMKEN PRIMER
On the Care & Character of Bearings
32 Pages
TIMKEN PRIMER
On the Anatomy of Automobile Axles
52 Pages

Understand Your Motor Car!

¶ These two free booklets will give you a clear conception of the importance and the construction of axles and bearings—the foundations on which the whole car rests.

¶ They are yours for the asking—sent free, postpaid, on request to either Timken Company. Write for the

Free **Timken Primers** *Free*

ON BEARINGS ON AXLES

¶ Called Primers because written in plain non-technical language that anyone can understand. One car owner writes: "The Timken Primers are certainly a boon to the owner of an automobile; they are extremely interesting and contain a wealth of information."

Here are some of the Subjects covered in the Timken Primer on Bearings

¶ Importance of the bearings.

¶ The many different things that the bearings must do.

¶ Where to find the anti-friction bearings in a motor car.

¶ A B C of Timken Tapered Roller Bearings.

¶ How the Timken Bearing works. How it is made.

¶ A very important comparison of the principles of various types of ball and roller bearings.

¶ Care of bearings—lubrication and adjustment.

In a simple, human-interest way Timken Primer on Axles tells:

¶ How life and safety depend on the axles.

¶ How the rear axle performs four distinct functions and is composed of several hundred separate pieces requiring thousands of operations to make.

¶ It tells how to lubricate, adjust and care for the axles.

¶ In separate chapters it takes up the front axle, the rear axle and axles for commercial cars. It explains full-floating, torque, action of the differential, of the brakes and many other things.

¶ The Timken Primers don't try to sell you anything. Timken Axles and Bearings are sold only to motor car manufacturers to be incorporated as integral parts of their cars. The Primers will give you just the information you need to properly appreciate and understand the fundamentals of your motor-car. They are free. Send for them today.

The Timken-Detroit Axle Company
Detroit, Michigan, U. S. A.

The Timken Roller Bearing Company
Canton, Ohio, U. S. A.

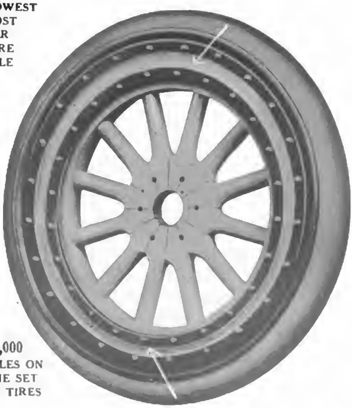
205

SEWELL CUSHION WHEELS

Put Trucks on Easy St.

No device on the market has done more to put truck delivery on a sound foundation than the SEWELL CUSHION WHEEL.

This happy medium between the resilient, easy riding pneumatic tire and the durable solid tire tread, has definitely solved the problem of traction expense in connection with commercial cars.



LOWEST COST PER TIRE MILE

15,000 MILES ON ONE SET OF TIRES

In structure, the SEWELL CUSHION WHEEL is a wheel within a wheel, the powerful rubber cushion supporting the two rims. This cushion absorbs all the jolts and jars which would otherwise be transmitted from the solid tire tread to the delicate working parts of the truck. It gives solid tire treads all the resiliency and easy riding qualities of pneumatic tires without the annoyance and expense of blow-outs.

One set of SEWELL CUSHION WHEELS will last as long as your truck because they are strongly constructed of the best material, the rubber cushion being amply protected by our specially constructed steel flanges.

The owner whose trucks are constantly in service cannot afford to overlook the advantages of the SEWELL CUSHION WHEEL. Its use means more dependable and rapid delivery, longer life to the truck, and the elimination of tire upkeep expense. Our wheels are now in use on the motor fire apparatus of many of the leading cities in the country, and we have testimonials which show that SEWELL users "stand pat" on the SEWELL platform for the elimination of traction troubles. Write for our interesting booklet. For sale by

CORTLANDT F. AMES
1114 Michigan Ave. CHICAGO

A Steadily Increasing Demand Is the Best Proof of Satisfaction

THE number of motor truck tires changed from other makes to Goodrich Wireless during July was 286, during August 421, and during September 481. The number of truck owners who thus insured themselves against tire trouble was 100 in July, 156 in August, and 185 in September, and the different lines of business numbered 49, 56 and 64 respectively. 12 different makes of tires were replaced.

Built on Steel
Wear like Steel

GOODRICH
WIRELESS
MOTOR TRUCK
TIRES

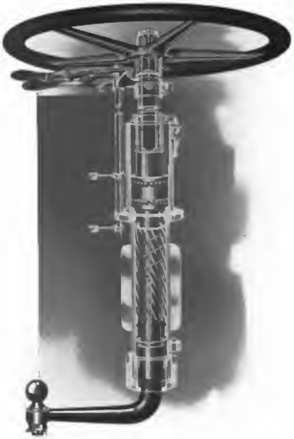
(Demountable Block—Pressed-on Electric.)

A Tire for Every Day—A Type for Every Service
The Tire That Satisfies

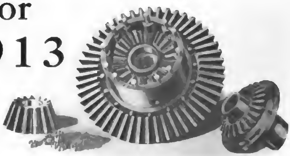
THE B. F. GOODRICH CO.

AKRON, OHIO

BRANCHES IN ALL PRINCIPAL CITIES



ROSS STEERING and DIFFERENTIAL GEARS for 1913



In designing your new models or making changes in your present models, investigate ROSS Steering and Differential Gears. They are the standard on motor trucks, and are the result of six years' experience.

The highest grade material is used throughout their construction, and they are subject to the most rigid inspection.

FURTHERMORE, they are made in the best built, newest and most completely equipped mechanical parts factory in this country.

ROSS GEAR AND TOOL CO., 700 HEATH STREET
LAFAYETTE, IND.

STANDARD
WHEELS

In the line of heavy commercial truck work we stand alone. Our stock of dry materials for this type of work is the largest to be found in America

There are very few wheel manufacturers prepared to make wheels with over three-inch spokes, while we list and will furnish spokes up to six inches.

Motor truck makers owe it to themselves to get acquainted with us.

We are the largest wheel manufacturers in the world.

Write us regarding your requirements.

STANDARD WHEEL CO.
Terre Haute, Indiana.

Kelly-Springfield
SECTIONALS

At this season of the year with slippery pavements to contend with the danger of accidents through tire skidding is eliminated by the use of Kelly-Springfield Sectionals. "They can't skid" and the use of tire chains becomes unnecessary.

Their increased adoption by experienced truck owners warrants your careful investigation if you are seeking maximum tire efficiency at minimum tire cost.

A few of the numerous reasons in favor of Kelly-Springfield Sectionals are as follows:

1. The wearing out of one section of a Kelly-Springfield tire does not necessitate complete re-tiring—simply the replacement of one section.
2. Kelly-Springfield tires are less affected by heat than the continuous type, because they are air cooled between sections. This is important, since it is heat that burns up tires.
3. Kelly-Springfield tires have double the resiliency because they have plenty of room to expand lengthwise as well as laterally.

Think these reasons over and then write us for further details.

KELLY-SPRINGFIELD TIRE COMPANY

New York, N. Y., and Akron, Ohio

BRANCHES: Boston, Mass. Atlanta, Ga. Chicago, Ill. Cincinnati, O. Cleveland, O. Philadelphia, Pa. San Francisco, Cal. Baltimore, Md. St. Louis, Mo. Los Angeles, Cal. Seattle, Wash. Detroit, Mich. Buffalo, N. Y.

NATIONAL

AUTOMOBILE

SHOW

January 20 to 25

Commercial Cars

(Gasoline and Electric)

Parts and Accessories

January 11 to 18

Pleasure Cars

(Gasoline and Electric)

Motorcycles

Parts and Accessories

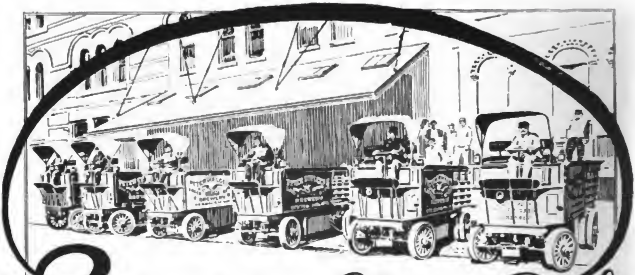
In Two Buildings
For Two Weeks

Grand
Central
Palace

Lexington
Avenue
46th-47th St

Madison Square Garden
Madison Ave, 26th-27th St

One Admission To Both Buildings



Each of these Electric Trucks saves \$800$^{\underline{00}}$ a year

In New York City Electric Trucks are saving Peter Doelger $30,000 a year. He has cut his delivery cost per barrel 27%—the increase in the efficiency of his delivery system, over horse hauling, is beyond comparison.

This Is Only One Instance

Electric Trucks are saving money for progressive business men in ALL parts of the country in ALL lines of business; 8,000 of them in active service today are proving that 80% of the trackless city horse haulage can be handled by Electrics cheaper and better than by any other method.

Here Are More Facts

One seven-ton truck is hauling all the coal used by the Hudson and Manhattan R. R. Terminal Building, one of New York's great skyscrapers. This truck does more work than four three-horse teams formerly did. An Electric Truck with an electric winch has displaced two wagons, four horses, eight men and one handcar for Henry Disston & Sons, Inc., Philadelphia, and the work is being done better, more satisfactorily and at less expense.

Big Businesses Buy Fleets

Big corporations who figure cost to a penny, make efficiency a watchword, endorse the Electric. Here is just a partial list of those who have found Electrics best by test.

Some of the Larger Fleets of Electric Vehicles in Operation in New York

Adams Express Company	53 Cars
American Express Company	104 Cars
Central Brewing Company	31 Cars
Dakota Stables	63 Cars
Peter Doelger	39 Cars
Geo. Ehret	64 Cars
Fleischmann Company	45 Cars
Gimbel Brothers	85 Cars
Jas. A. Hearn	36 Cars
Hoyt & DeMallie	27 Cars
R. H. Macy	38 Cars
New York Edison Company	107 Cars
New York Transportation Co.	125 Cars
Piercy Contracting Company	45 Cars
Jacob Ruppert	30 Cars
Ward Corby Company	215 Cars
Motor Delivery Company	48 Cars
United Electric Light & Power Co.	25 Cars

And in addition, hundreds of others who are using Electric Vehicles for a wide variety of business. At the present time there are in New York City alone 2,000 Electrics.

What Can Electrics Do For You?

You ought to investigate the Electric right now. It means increased economy and efficiency you can't afford to overlook.

If you like, we will gladly send you interesting literature about Electrical Commercial Vehicles

Public interest and private advantage both favor the Electric.

ELECTRIC VEHICLE ASSOCIATION OF AMERICA

BOSTON NEW YORK, 124 W. 24th St. CHICAGO

What You Get When You Buy a

Baker Electric Truck

You get the backing and engineering resources of the most perfectly equipped and largest plant in the world devoted exclusively to the manufacture of electric vehicles.

You get the result of 14 years' leadership in developing the electric motor car industry—no experimenting with any other type of machine.

You get a truck built to a standard which has established the criterion of what to expect from a battery-driven vehicle.

You get the most sweeping and far-reaching guarantee ever put on a truck—the guarantee of Baker design, Baker material, Baker construction, Baker workmanship, Baker reputation.

These produce Baker Service—and Baker Service means the maximum in reliability and *money-saving* efficiency.

The Baker consumes less current per ton mile than any other electric truck; this combined with unique simplicity of construction, high grade materials and workmanship, the small number and cheapness of wearing parts makes the cost of operation and maintenance phenomenally low.

We want to demonstrate these facts to you—and to let a representative of our company, or our transportation engineer, tell you without charge or obligation, what the Baker could do for *your* business. Our Transportation Cost Bureau will furnish interesting figures on your individual problems.

500 Pounds to 4 Tons Capacity

Application is solicited from responsible people for representation in open territory.

THE BAKER MOTOR VEHICLE COMPANY, CLEVELAND, OHIO

Builders also of Baker Electric Coupes Victorias and Broughams

Los Angeles, Tenth and Olive Sts.
Kansas City, 3105 Gillham Road
Detroit, 815 Woodward Av.
Chicago, 2023 Michigan Av.
New York, 1798 Broadway
Washington, 1138 Connecticut Av.
Spokane, 818 Fourth Av.
Boston, 801 Boylston St.
Seattle, 1718 Broadway
Sacramento, 1217 Seventh St.
Richmond, 1623 West Broad St.
Philadelphia, 1927 Market St.
Denver, [illegible] Broadway
CANADA: The Baker Motor Vehicle Company of Canada, Ltd., Walkerville, Ont

Representatives in Other Leading Cities

THE Detroit ELECTRIC

Commercial Vehicles

Detroit Electric Commercial Vehicles Adapted to Frequent Stops

MR. MERCHANT, you will lose or gain on your delivery service, according to the fitness of the equipment you use. Your delivery work probably calls for frequent stops, the delivery of a parcel here, another one across the street, then some a few blocks further, etc. All of which demands for economy of time and money quick stopping of the vehicle, quick starting and no loss of time between deliveries to customers. Also there must be no waste of power while the car is standing still if there is to be the greatest profit from this department of your business.

Detroit Electrics are admirably adapted to meet all these requirements. They are the most practical, on the rigid standard of profit in dollars and cents.

Detroit Electric Commercial Vehicles "get away" instantly. They pick up speed quickly and smoothly, causing no loss of time in starting.

All speeds are controlled with one lever, the application of power being continuous. No loss of headway in changing speeds.

Then, too, they stop quickly and easily and when the car stops, the power stops—and the expense for power. There is absolutely no loss from useless running of the motor or from wear of parts while your drivers are making deliveries. This feature of the electric vehicle makes it especially suitable for the merchant's use and insures the greatest economy in the use of the delivery equipment.

Besides these valuable features of the Detroit Electric, there are the qualities of absence of noise and odor, which makes this the ideal commercial vehicle for city and suburban use. They are handsome and trim in appearance and make a distinct advertisement of the progressiveness of the merchants who use them.

Let us take up your delivery problem with you and help you to make the most practical selection of equipment. Our 48-page illustrated catalog will be sent on request.

ANDERSON ELECTRIC CAR COMPANY

454 Clay Avenue, Detroit, U. S. A.

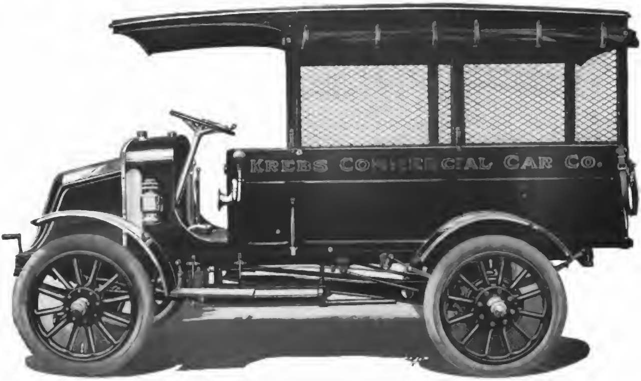
BRANCHES:

Boston
Brooklyn
Buffalo
Cleveland

New York: Broadway at 80th St.
Chicago: 2416 Michigan Avenue
Selling representatives in
most leading cities.

Evanston
Kansas City
Minneapolis

The Krebs—"The Car That Thinks"
With Its Governor Every Driver Is An Expert



Model B. Krebs Commercial Car with standard delivery body, screened. Guaranteed capacity ¾ ton.
Price of Chassis with shaft drive as shown, or chain driven, $1375.

Set the governor of the Krebs at any desired speed per hour and it maintains that rate—up hill—down hill—or on the level—with the minimum of fuel needed.

The Krebs is more economical—by reason of its marvelous governor—than any car driven by human judgment.

No matter what the road conditions, its speed is constant at any rate desired, from its maximum down to two miles per hour.

The governor automatically gives the motor just enough gas to overcome grades; shutting off the fuel with each descent or level stretch.

Efficiency and economy are built into the Krebs. You need not fear to intrust it to an inexperienced driver. *He has nothing to do but steer.*

Unlike all other "governed" cars, speed can be changed while running, but unless the governor is changed, it will always keep the motor at the speed indicated.

Model A. has a chain driven chassis and solid tires, with standard Open Express Body and Cab Seat. Guaranteed capacity one ton. Price $1,510. Speed up to 15 miles per hour.

Model B., as shown above, is fitted with shaft driven chassis and pneumatic tires. Guaranteed capacity ¾ ton. Price $1,550. Speed up to 20 miles per hour.

The Krebs motor is valveless; its minimum of parts makes it the least expensive in repairs and maintenance.

The liberal equipment includes storm shield with front and side curtains, fitted with celluloid windows—affording complete, enclosed protection for the driver.

The Krebs is a splendid proposition for dealers, because in size, capacity and price it appeals strongly to the largest possible number of users. Add to those qualifications Krebs economy, simplicity, and the positive action of its governor, and it offers greater advantages both to dealer and owner than any other car ever built for commercial use.

Write today for complete information

THE KREBS COMMERCIAL CAR CO., Clyde, Ohio

MODERN
THE BOWLING GREEN MOTOR CAR COMPANY

DELIVERY TRUCKS

Two Capacities—1000-1300 pounds—1500-2000 pounds
Complete in six models—engine under hood or foot boards

MODERN simplicity is the kind that users appreciate—not the kind that results chiefly in less work for the factory in building. What really counts is the simplicity that makes for ease of frequent inspecting and the quick removing of any part when necessary; simplicity in work done on the car for a given service—not the kind that merely means less parts.

All mechanism is well protected and the whole construction is sturdy throughout, with a fine *balance* in strength. One important feature in the MODERN making for lowest upkeep cost is the superior action of the springs; these give very easy riding without load, and are amply strong to perform their duty at the maximum capacity—conclusive evidence of *quality*.

Long Stroke Motors—long springs of wide range of action—long wheel base—large transmission parts—low center of gravity—left hand steer, center control—large tires.

Low in price but of exceptional quality.

Dealers—Mention Your Sales and Service Facilities in Writing for Territory
Our factory is equipped to fill orders with unusual promptness
Specializing only on Light Delivery Motor Trucks

The Bowling Green Motor Car Co.

Bowling Green, Ohio

COMPLETE INSTALLATION

GASOLINE **GMC** ELECTRIC

TRUCKS

COMPLETE SERVICE

Model K
Capacity 5 tons
Price,
Chassis only,
$4400

Father of a 15-truck fleet

Recently, James Butler, Inc., the great New York chain grocery house, ordered five additional G M C trucks, making fifteen in all. This company has largely standardized its equipment with G M C models. They are getting *service every day* that has revolutionized their immense haulage.

Long distance deliveries are simplified by these powerful trucks, which are at work day and night. The Butler Company has so systematized its service as to make every one of these fifteen trucks pay handsome dividends.

The Butler Company has studied the truck situation thoroughly, because its installation of one truck dates back to January, 1910. It has been convinced by *actual service* and *durability* that G M C trucks meet *every* requirement down to the smallest detail.

Proof of the reliability, efficiency and economy of G M C trucks is the constant repeat orders by users who give their equipment the hardest service.

G M C trucks are built for every kind of haulage from the 1000-lb. type up to 6 tons in standard-capacity models. General Motors Truck Co., in fact, was the first to recognize not only the necessity for trucks of all standard capacities, but was the *first* to build both gasoline and electric types. Types to meet every demand.

So highly standardized a line as the G M C must appeal to business men. Whether one truck or a fleet is purchased, it is necessary to look to the future—to the *continuance* of that line, to the *reputation* of the manufacturer, to his *financial* stability and *engineering* and *mechanical* capacity. General Motors Truck Co. is building for the future, as well as for today—a policy adopted at its inception.

Correspondence from prospective purchasers and dealers is invited. Write for gasoline and electric catalogs.

GENERAL MOTORS TRUCK COMPANY

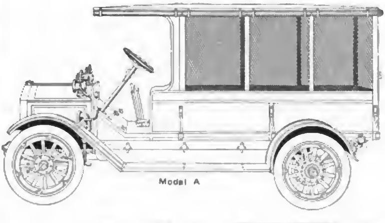
30 Cadillac Ave., PONTIAC, MICHIGAN

Branches: New York, Chicago, Boston, Philadelphia, Kansas City, Detroit, St. Louis.

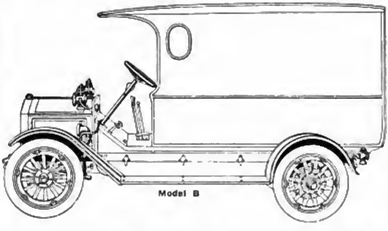
THE BROWN

1500 LBS CAPACITY

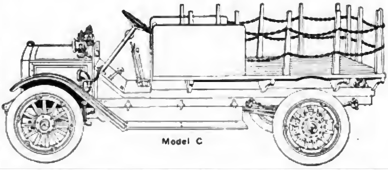
THE MASTER CAR of MASTER MINDS



Model A



Model B



Model C

Here is a car that is destined to literally over-run the country wherever cars of 1500-pound capacity—but capable of more—are wanted at this time or will be wanted later.

The reason for this prairie fire of popularity will be entirely logical—the demand already exists to start with—the ideal car is now at hand—the price is a happy one for both buyer and seller—the "service," (that important word) is back of the car—the men who are building the Brown are experienced, level-headed, successful men in the world of motor car merchandising, and last of all the Brown plant is one of over 90,000 square feet of floor space, consisting of 7 buildings on 13 acres of ground with Wabash, N. Y. Central, C. & O., and Belt Line R. R. side-tracks into plant giving shipping facilities of an absolutely unexcelled character.

It takes a good plant—plus good men—to turn out a good product

This being true in any line of business, we therefore tell you about ours.

Add to this kind of a plant the identity of such men as Will H. Brown and Cart H. Wallerich at the head of things, then look at the chassis illustrations, the finished jobs with standard bodies equipped, study the specifications on the opposite page, and if it all looks as good to you as it does to some of the greatest and most conservative buyers of commercial cars in the entire world—buyers who have already bought of us, whose names we will be glad to furnish in correspondence—get in touch at once for further particulars and LET'S DO BUSINESS.

Dealers who have been wishing for a DEPENDABLE commercial car that could be shipped to them all ready, including body, for immediate delivery to customer will act *quick* on an Agency Arrangement with us.

YOU WAITED

FOR THIS VERY CAR
NOW READ THE SPECIFICATIONS

MOTOR (CONTINENTAL)—
4 cylinder; 4 cycle.
Cylinder—"L" head, cast en bloc.
Cooling—Water.
Bore—3¾ inches.
Stroke—5¼ inches.
Lubrication—Constant level circulating system, with two pumps.

PISTON—
Special gray iron, accurately ground, provided with four piston rings.

CRANK SHAFT—
Drop forged, 35 point carbon open hearth steel, heat treated.
Diameter—1¾ inches.
Number of Bearings—Three. Front, 2¾ inches; center, 3 inches; rear, 4 inches.
Bearings are die cast of Parson's White Bronze, scraped to accurate fit.

CONNECTING RODS—
Drop forged, 35-point carbon open hearth steel, heat treated.
Bearings—2½ inches long, die cast of Parson's White Bronze.
Wrist Pin—1 inch diameter.

CARBURETOR—
Type—Float feed.
Control—By lever on top of steering wheel.

IGNITION—
Remy model R. D. Truck type magneto.
Control—By lever on top of steering wheel.

COOLING—
Circulation—By centrifugal pump.
Radiator—Improved vertical tube type, suspended on coil springs.

CLUTCH—
Dry plate type with 27 plates; facing is a composition of woven asbestos and copper wire.

TRANSMISSION (BROWN-LIPE)—
Selective type—Three speeds forward and reverse.
Gear—3½ per cent. nickel steel. Imported annular bearings throughout.
Gear shifting levers in center.

DRIVE—
From transmission to driving axle by tubular Cardan shaft, 1¾ inches in diameter, with two dust-proof universal joints of ample size.

DIFFERENTIAL—
Bevel gear type.
Bearings—Double row annular.

BRAKES (RAYBESTOS LINED)—
Two Sets—Internal expanding and external contracting on brake drum 15 inches in diameter—2½-inch face.

FRONT AXLE—
Drop forged "I" section. Spindles are of liberal size, drop forged of nickel steel, heat treated.
Bearings—Annular type, inner set double row, outer set single row.

CONTROL—
Steering wheel is on left side.
Change gear levers and emergency brake levers, center.
Service brake and clutch controlled by foot pedals.

SPRINGS (PERFECTION)—
Front—40x2-inch semi-elliptic
Rear—50x2-inch semi-elliptic.

FRAME (HYDRAULIC PRESSED STEEL)—
Frame is of carbon steel, hot rolled and cold pressed, being 4½ inches deep entire length and 4 inches wide at the center, tapered toward the end. Inswept at front to facilitate turning.

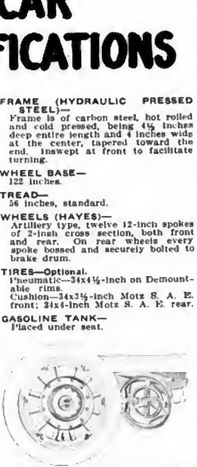
WHEEL BASE—
122 inches.

TREAD—
56 inches, standard.

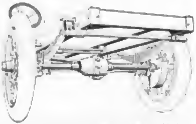
WHEELS (HAYES)—
Artillery type, twelve 12-inch spokes of 2-inch cross section, both front and rear. On rear wheels every spoke bossed and securely bolted to brake drum.

TIRES—Optional.
Pneumatic—34x4½-inch on Demountable rims.
Cushion—34x3½-inch Motz S. A. E. front; 34x4-inch Motz S. A. E. rear.

GASOLINE TANK—
Placed under seat.



Wheel Removed Illustrating Internal Gear

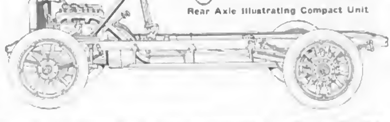


Rear Axle Illustrating Compact Unit

PRICE $1650 BODIES TO MEET ALL REQUIREMENTS

Dealers desiring Territory and Prospective Buyers desiring more information will please address

Brown Commercial Car Co.
FACTORY, PERU, INDIANA
INDIANAPOLIS OFFICE
450 NORTH CAPITOL AVE.



The Standard

400 LESS PARTS

HEAVY DUTY MOTOR TRUCK

400 LESS PARTS

An All-Star Assembly of Standard Products

A Motor Truck Embodying Nothing But STANDARD Conventional Design in ALL PARTS. A Highly Efficient Truck of 3, 4 and 5 Ton Capacities. No "Features," No New Ideas, No Unproved "Theories"—Just "Standard" in EVERY Detail and as Safe to invest in as GOVERNMENT BONDS.

If YOU are a "Standard" Dealer,
GET OUR PROPOSITION

Prospective Truck Buyers will write for our catalogue before deciding on ANY truck. That catalogue makes the finest kind of reading. It tells WHY an "All Star Assembly of Standard Products" is Everlastingly BEST for you. We'll be glad to send it on application.

Standard Motor Truck Co.

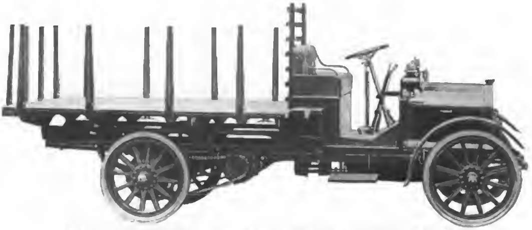
973 Belleview Ave., Detroit, Mich.

3-Ton Capacity $2750

THE SELDEN TRUCK

The Sturdiest One-Ton Truck on the Market

Price $2000.⁰⁰



Selden One-Ton Chassis, Including Seat and Equipment, $2000.00. Body Extra.

The Selden Truck is produced by a Company with long experience in motor car building, whose guarantee for years has been as good as if backed by a gold bond.

It is built for business. Every vital part has been constructed with a large factor of safety, heavier and stronger than even the highest standards require, so that it will more than meet the demands of hard, constant service.

The Selden Truck has a rated capacity of one-ton, and we sell it to carry a one-ton load; but we claim that because of its high grade and substantial construction, it will stand up better under hard work and will be more economical than any other truck of its class.

Some of the Selden's Good Features:

LOW PRICE
UNIT POWER PLANT
LONG STROKE MOTOR
DRY PLATE CLUTCH
LARGE FUEL CAPACITY
EFFICIENCY AND ECONOMY
SINGLE CONTROL
LARGE FACTOR OF SAFETY
SEALED ENGINE GOVERNOR

The Most Progressive Step in the Automobile Industry

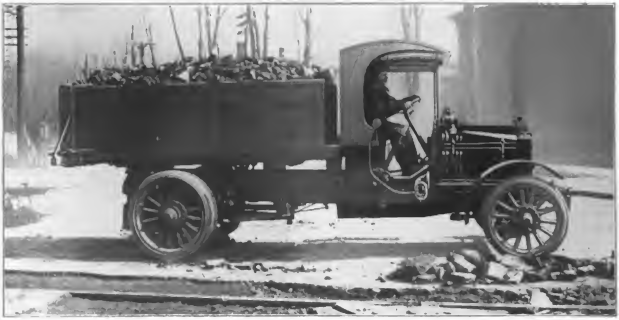
In order to place the Selden truck within easy reach of the thousands of merchants and manufacturers who can't conveniently take the necessary cash out of their business all at once, we have inaugurated a partial payment plan that will appeal to every progressive business man.

We will sell you the Selden Truck direct or through our nearest agent on the following terms: $500.00 on delivery of truck and balance in twelve monthly payments.

The Selden truck is easy to buy and easy to pay for.

We have some valuable territory open for live responsible agents who are looking for the best selling proposition ever offered. Write at once, giving sales and service facilities.

SELDEN TRUCK SALES CO., Rochester, N. Y.



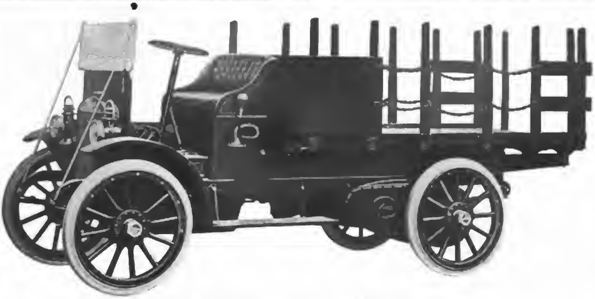
A satisfactory and economical solution to your transportation problem is found in the Pierce-Arrow Truck because of its worm gear drive which stops the little leaks—minimizes power waste and lessens up-keep costs. Its proven efficiency is assured by this guarantee:

> The worm wheel and worm shaft, generally known as worm gear construction, employed in the Pierce-Arrow Truck, are warranted to fulfill their functions for one year from date of shipment under normal service.

PIERCE-ARROW

5-TON MOTOR TRUCKS

THE PIERCE-ARROW MOTOR CAR COMPANY, BUFFALO, N. Y.



NATCO One Ton Stake Truck

Wheel Base—104 in. Motor—4 cylinder, 3½ in. bore, 5 in. stroke. Change Gear—Selective Type, three forward speeds. Power Transmission—Side chain drive, chains encased. Left side drive. Central control. Tires—Quick detachable, 36 in. by 3½in., front and rear. Weight of chassis—2700 pounds. Length over all—14 ft., with 8 ft. pay load body. Transmission and Counter Shaft mounted on F. & S. heavy duty type annulars. Axle Bearings—Timken.

Chassis Price: $1925.00, seat, tank and equipment included.

WHY THE NATCO?

For Buyers:

BECAUSE NATCO Trucks are backed by the National policy, honest product, prompt service and fair dealing.

BECAUSE NATCO Trucks are designed and constructed to meet specific service requirements. They are in no sense an experiment.

BECAUSE NATCO Trucks are produced by a factory organization which has been held intact for fifteen years.

BECAUSE NATCO service is backed by forty years of manufacturing, marketing and transportation experience.

BECAUSE NATCO representatives are equipped and qualified to render efficient service.

For Dealers:

BECAUSE our developed policy is conservative, safe and sure. We consumed sixteen months in developing our first model to a point where we could safely risk our reputation as well as yours on its satisfactory performance in every class of service.

BECAUSE our manufacturing policy is one which insures the buyer and dealer against unnecessary risks and financial loss.

BECAUSE 74% of every NATCO Truck is made in our own factory

BECAUSE we have direct supervision over every operation from the raw material to the finished unit. The production of motor trucks on this basis requires extensive resources and manufacturing facilities, but it is the only possible guarantee of uniformity, interchangeability and refinement

BECAUSE the NATCO marketing policy is co-operative and produces results in concrete form.

Send for December Series, "OUR NATIONAL POLICY," if it does not reach you on or before the 10th instant.

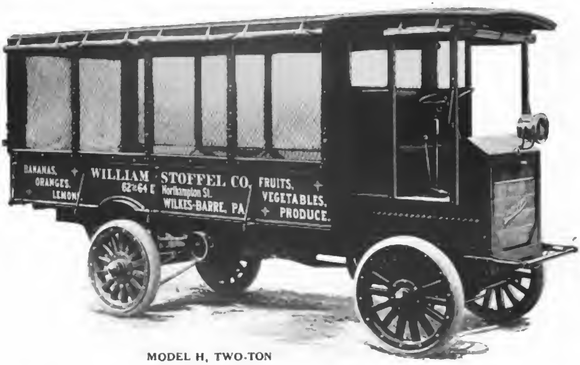
NATIONAL MOTOR TRUCK CO.

Under Same Management as National Cycle & Mfg. Co.

BAY CITY, MICHIGAN

Lauth-Juergens

ONE, TWO, THREE AND FIVE-TON TRUCKS



MODEL H, TWO-TON

Another successful year for Lauth-Juergens Trucks has demonstrated the truth of our statements that there are no trucks made equal to the Lauth-Juergens line. They have proven that they are the most substantial, best designed, most thorough in workmanship and possess the best material of any truck on the American market to-day.

Lauth-Juergens trucks are backed by a real guarantee from a corporation who will give the user the benefit of the fullest terms of that guarantee and the agents handling the Lauth-Juergens truck are the kind who will give the user the service which permits of the use of this truck every day in the year. We have some unoccupied territory for agents who will give us proper representation. Send for our complete motor truck catalogue giving specifications of the one, two, three and five ton trucks.

Address **LAUTH-JUERGENS MOTOR CAR CO.**

FREMONT, OHIO

Branches, Agencies and Service Stations

Boston, Mass.	Meyer, Abrams & Co.
Chicago, Ill.	Lauth-Juergens Motor Car Co.
Newark, N. J.	Merchants Motor Car Co.
Bridgeport, Conn.	Jennings-Sherwood Carriage Co.
Barre, Vt.	Perry Auto Co.
Washington, D. C.	Bowles Motor Sales Co.
Danville, Va.	West End Motor Car Co.
South Boston, Va.	Franklin & Fowlkes
Duluth, Minn.	Mutual Auto Co.
Memphis, Tenn.	W. R. McDonald & Co.
Detroit, Mich.	Biell Motor Truck Sales Agc'y
Toledo, Ohio	Grasser Motor Car Co.
Charleston, W. Va.	Hugh Nicholson
Los Angeles, Cal.	P. A. Brink

⁎ New York ⁎
Show Number

of

The Commercial Vehicle

THE big January issue will contain complete data and specifications covering every commercial vehicle manufactured. A buying guide that reaches buyers when they have time to study and form buying decisions.

¶ Use your largest copy in the January Issue of The Commercial Vehicle —tell your whole sales story—use large enough space to properly represent the importance of your message and the superiority of your product.

¶ Send copy as early as possible.

The Commercial Vehicle

239 West 39th Street
New York

KISSELKAR TRUCKS

Buyers who Understand Construction Prefer KisselKar Trucks

STRIP a KisselKar Truck of its body and take a critical look at the chassis if you would understand its remarkable power and endurance.

Here's a chassis rated at three tons burden capacity.

It carries a 4 cylinder 50 horse power longstroke Kissel motor.

Its gasoline capacity is 25 gallons.

It has *four* speed transmission. On fourth speed it will make eighteen miles an hour *—without racing the engine.*

It has a lock on its differential which enables the driver, by the mere pulling of a lever, to lock both rear wheels, a device of obvious value when one wheel, for any reason, should slip or refuse to work.

Its every vital unit, aside from the motor—namely: transmission, gears, steering knuckles, etc.—are of Chrome Vanadium anti-fatigued steel. Its frame is of the staunchest channel steel, triple riveted.

Every known improvement, many of them exclusive, that makes for economy of fuel, ease of control, simplicity of operation, reserve strength and general efficiency, are embodied in this chassis.

Made in carrying capacities of 1500 pounds, 1, 2, 3, 4 and 5 tons—each differing in specifications, but built on the same perfect lines.

KisselKar Service stations in all principal cities offer *quickly accessible* mechanical aid to owners, every station manned with skilled factory-trained experts and equipped with all parts. It's an incomparable service in every sense.

Write for facts and figures proving the economy of KisselKar Trucks in *your line.*

KISSEL MOTOR CAR CO., 157 Kissel Ave., Hartford, Wis.

BOSTON CHICAGO NEW YORK DALLAS ST. PAUL MINNEAPOLIS MILWAUKEE LOS ANGELES KANSAS CITY

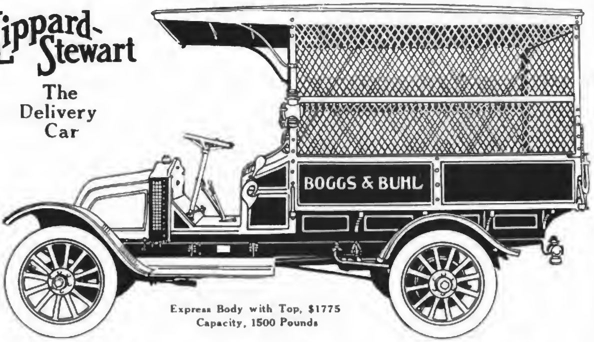
Philadelphia, Cleveland, Detroit, El Paso, San Antonio, New Orleans, Baltimore, Omaha, Butte, Denver, San Francisco, Seattle, Portland, Duluth, Buffalo, Pittsburg, Hartford, Conn.; New Haven, Albany, Troy, Montreal, Quebec, Toronto, Winnipeg, and 200 other principal points throughout America.

Here Is a Delivery Car That Practically Sells Itself

Lippard-Stewart

The Delivery Car

Panel Body	$1800
Express Body with Top	$1775
Open Box Body	$1775
Stake Body	$1775
Police Patrol	$2325
Ambulance	$2325
Hotel 'Bus	$2325



Express Body with Top, $1775
Capacity, 1500 Pounds

The Lippard-Stewart Model "E" 1500 lb. Delivery Car 30 H. P.

It's the Record of a Car that Counts. As a business man you know that the worth—the reputation—of any delivery car depends entirely upon that car's ability to give the maximum of efficient and economical service under the most adverse conditions for a long period of time. What the Lippard-Stewart Delivery Car has done, how well it has done it and is doing it is evidenced by the complete satisfaction this car is giving its owners.

Here is a Real Delivery Car—designed and built a Delivery Car from the ground up. Not a compromise—not a commercial body on a pleasure car chassis, but a practical commercial vehicle that is a leader in its class. Strong, dependable and serviceable—low in first cost and economical in upkeep—a car that will deliver more goods over a wider territory at less cost per package than was ever thought possible, and—these statements are not merely the claims of an enthusiastic manufacturer; they are absolute facts.

Analyze the Car Closely. Examine its perfect chassis—strong yet simple in construction—its frame built heavier and wider at the point of greatest stress and reinforced with corner gusset plates. Note the 30 H.P. Continental Motor. As a dealer—a man who knows cars—your own knowledge of this motor will evidence its efficiency. Consider the rugged cone clutch and the transmission strong enough for a 50 H.P. Car. Observe the shaft drive, the differential, the simplicity of construction practiced throughout the entire building of the car. Note the easy get-at-ability of every important mechanical part even when the car is loaded, the left-hand drive and center control and how easily the car can be operated. Look at the perfect spring suspension that assures easy riding and minimizes wear and tear. Then—

Consider the Price of the Car—its sound dollar for dollar value. Compare it with any delivery car apparently competing with it and its superiority becomes amply apparent. As a dealer form your own conclusions as to the car's value as a business investment—its ready saleability and the quick turnover of capital it assures. Last but not least—

Note the Comprehensive Lippard-Stewart line—the volume of sales it makes possible—a line that offers you a car to meet the specific demands of practically every firm and individual who need a delivery car regardless of their business—a line that will build you a profitable and increasing business upon the firm basis of satisfied customers.

Read These Special Features of Lippard-Stewart Construction. Continental 30 H.P. Motor, Eiseman Magneto, Brown-Lipe Selective Transmission, Cone Clutch, Full Floating Timken Rear Axles, Timken Roller Bearings throughout, Special Spring Suspension, Left-hand Drive, Pneumatic Tires 35 x 4½ Front and Rear—full equipment of Lamps and Tools.

We Want Good Dealers Everywhere. We have a splendid opportunity to offer first-class, up-to-date, energetic men—men who can measure up to our standard of integrity and business ability. If we have no dealer in your town and if you are the logical man to represent us—a man who can grasp the big possibilities of our proposition and handle it in the way it should be handled, write us instantly.

We will Exhibit at the New York, Boston and Chicago Shows

LIPPARD-STEWART MOTOR CAR CO.

Buffalo, N. Y.

AUGUST BECKER, President
E. J. BARCALO, Treasurer
J. C. MILLAR, Secretary
C. S. DAHLQUIST, Chief Engineer
WILBUR F. REYNOLDS, Sales Manager

LIPPARD-STEWART MOTOR CAR CO. C.V.
Buffalo, N. Y.
Please send catalogue and dealer's proposition immediately.
Name ....
Street ....
City .... State ....

Modern Business Demands Efficient Delivery

JARVIS-HUNTINGTON Trucks

are the best built, most completely equipped and most conveniently priced trucks on the market. JARVIS-HUNTINGTON distributors and customers are treated right.

It took three years of test and experiment to satisfy us as to the quality of our trucks, and if they satisfy us with our thirty-six years' experience in engine and locomotive construction, they will satisfy you.

All the weak points were eliminated by gruelling road tests in the mountains of West Virginia. Each year showed a decrease of weak points until to-day we can justly say that JARVIS-HUNTINGTON TRUCKS are Right. They deliver the goods.

SPECIFICATIONS

We make three models, two ton, $2750, three and one-half ton, $3500, five ton, $4400. Guaranteed for 10,000 miles of service. Our heavy duty motor is the most reliable and economical motor built. Ample power for all emergencies. Governor speed control. Bore four inches. Stroke six inches. Cylinders separately cast. Valve in the head with overhead camshaft. Transmission, selective type, three speed forward and reverse. It is our own make, *sturdy* in every detail. Gears of Vanadium steel. Clutch, Hele-Shaw, the best in the world. Brakes, efficient and strong enough to stop truck within its own length. Two separate brake systems. Stromberg carburetor. Ignition with Bosch high tension magneto and batteries. Springs, axles and rear construction—a large margin of safety. Tires, detachable, solid rubber. Our trucks are actually over tired.

Equipment—the most complete ever offered—electric lights, electric horn, Hub mileage recorder, reliable self-starter, complete tool outfit and a liberal supply of spare parts.

Send for Catalog and Agency Proposition

JARVIS-HUNTINGTON AUTOMOBILE COMPANY

Huntington, W. Virginia

White 5 ton truck One of the American
Can Co.'s White Truck Squadron

WHITE HEAVY SERVICE TRUCKS

Three and Five Tons

White Trucks for heavy service have proved to be more economical in the consumption of gasoline and oil than any truck of equal capacity.

Large steel wheels, and a perfect load distribution, make White Heavy Service Trucks the easiest to operate and the most economical in tire wear.

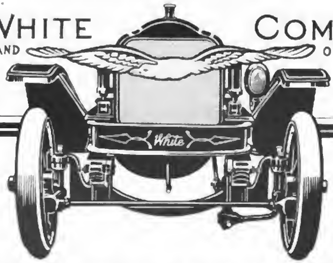
The name of White on a motor truck insures the lowest possible cost of upkeep, and the longest and most continuous service.

White Trucks are also built in capacities of ¾ and 1½ tons, for lighter service.

Detailed information furnished on request

THE WHITE COMPANY
CLEVELAND OHIO

Manufacturers of Gasoline Motor Cars, Trucks, Taxicabs



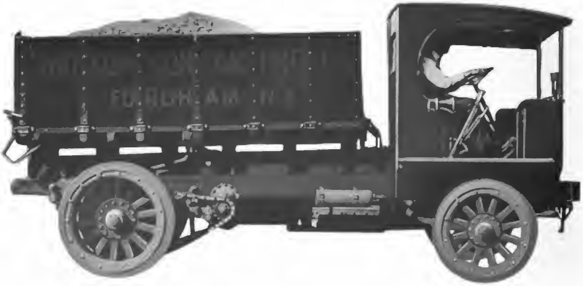
GRAMM TRUCKS

GRAMM transportation plans and truck equipment have done more toward economically re-organizing transportation problems than any other means yet introduced.

Investigate.

Please address Dept. 10

The Gramm Motor Truck Company
Lima, Ohio



Garford TRUCKS

GARFORD trucks bring biggest results for smallest cost. In other words, they stretch delivery dollars furthest.

Discuss Garford construction with any prominent transportation engineer. Ask him, urge him to pick a weak part. Talk trucks with Garford owners; get their viewpoint. To aid you we will send you the names of local owners immediately on request.

Here are the Garford reasons. They are good solid whys and wherefores.

Garfords have correct weight distribution—66 and 34 per cent. on front and rear axles respectively. The frames are made of indestructible pressed steel, riveted, bolted and strengthened by five sturdy cross sections. The entire load is carried on Krupp steel springs.

With conscientious maintenance a Garford will not show appreciable wear short of five years. It cannot be abused; in fact, the entire machine is completely protected. The motor is automatically governed. No driver can race it, nor can he exceed a ten mile speed.

No truck has as large loading space for the wheelbase as the Garford. No truck can have, whose motor is not alongside the driver's seat—practically under his feet. And in no truck but the Garford is it so situated.

This motor placement eliminates the overhang bugaboo. The Garford has not only the smallest wheelbase—but also the least overhang.

Garford straight line drive and four speed transmission puts every bit of power behind the load—no wasted effort.

We have records to back up these statements. Write us your delivery problem; we have data which means dollars to you. Please address Department 12.

The Garford Company, Elyria, Ohio

PACKING CASES AND BOX SHOOKS
ROCHESTER BOX AND LUMBER COMPANY
CULVER ROAD SUBWAY

THE U. S. WAR DEPT. BOUGHT 'EM

SO DID THE STANDARD OIL CO.

NICKEL, STEEL, OR BETTER, FROM STEM TO STERN

THE MAIS

ANY TIME YOU PUT ANYTHING OVER ON YOUR UNCLE SAMUEL YOU HAVE TO GET UP EARLY IN THE MORNING.

THE U. S. GOVERNMENT HAS BOUGHT A FLEET OF MAIS TRUCKS—NOT ALL AT ONCE—SOME FIRST AND THEN SOME MORE

THE U. S. WAR DEPT. KNOWS ALREADY WHAT YOU OUGHT TO KNOW ABOUT THE MAIS INTERNAL GEAR-DRIVE.

ALSO THE FAIR AT CHICAGO

WRITE FOR CATALOG EXPLAINING IT IN ILLUSTRATED DETAIL

"WHEELER AT THE WHEEL"

The men now owning and operating The Mais Motor Truck Co are experts in SUCCESS.

They are good men to tie to on general principles because the dope on their past performance makes them better than an even-money favorite right off the reel.

President Frank H. Wheeler, who, with George Schebler in the carburetor business, ran a shoestring up into a couple of million dollars in no-time-at-all, is "The Man at the Wheel."

The business acumen, sagacity and plain old-fashioned horse sense with which Wheeler turns EVERYTHING he undertakes into SUCCESS is now a by-word in the business worlds of two continents, and his entry into the commercial vehicle field at this time is only in keeping with the extremely accurate far-sightedness which has at all times guided him RIGHT.

That he should select The Mais as the "Line of Least Resistance" to SUCCESS is only another evidence of "Wheeler's Luck."

DEALERS who believe in stringing along with the winners will recognize the knock of OPPORTUNITY without the formality of a lot of red tape phraseology—but DON'T MISS THE BOAT by a day, an hour or a minute.

Things move swiftly with "Wheeler at the Wheel," so govern yourselves accordingly and GET BUSY.

THE MAIS MOTOR TRUCK CO., Indianapolis, Indiana

THE CHICAGO FIRE DEPT. BOUGHT 'EM

THE PRIDE OF THE INDPLS. FIRE DEPT.

WHOLESALE GROCERS PRAISE 'EM

A BEAR AT THE CHICAGO STOCKYARD

THE ONLY AMERICAN TRUCK THAT IS POSITIVELY A

SUCCESS

YOU'VE GOT A FINE CHANCE TRYING TO FOOL STANDARD OIL

THEY GAVE US A RE-ORDER

BREWERS CALL 'EM THE BEST

YOU MUST READ THIS LETTER IF IN THE MARKET FOR TRUCKS

CHICAGO PACKING CO.,
Chicago, Ill., Dec., 1911.

"We have just closed our sixth month running record of our MAIS Motor Truck, and the verdict is,

"'It's a wonderful machine.'

"Since we bought our MAIS Motor Truck we have used it every day, and it has been running a regular trip of about 60 miles per day. We wish to emphasize the fact that in the past two weeks we have had some very severe cold weather here, and also a heavy snow. This has not affected our delivery service, as our truck returned to the plant on due time, with the exception of two days. This was caused by our machine towing in the machines of our neighboring packers. For your information we wish to say that in the past two weeks almost all of the trucks from the Stock Yards have been stalled and had to be towed in, but

"'Not ours.'"

Let us send you a copy of our Book, "OWNERS' OPINIONS." It will tell you more about what you want to KNOW in 10 minutes than we could in a month—

In it are letters concerning MAIS SUPERIORITY from leading concerns in almost every line of business. Get it and see for yourself what other concerns in YOUR LINE are doing. Address

THE MAIS MOTOR TRUCK CO., Indianapolis, Indiana

WRITE FOR "OWNERS' OPINIONS"

TON MILES AT 5 CENTS AVERAGE

INDIANA-TRUCKS

CARRY 50% OVERLOAD

INDIANA MOTOR TRUCKS will be exhibited at First Regiment Armory, Chicago, Ill. Feb. 10-15, 1913

POWERFUL RUTENBER MOTORS

1-2 AND 3 TON SIZES

No freak experimental construction is used in INDIANA Trucks—they are models of simplicity, built extra strong, and do the work with great economy and remarkable efficiency. Take our Rutenber Commercial type motor, where can you get more downright worthiness?. Our special disc clutch obviates all shock to the mechanism—naturally that gives the INDIANA longer life. Artillery type wheels, all steel castings, Vanadium channel steel frames. Let us ask you, do such features appeal to a business man? Two INDIANA Trucks replaced 24 horses on a stage line in Kentucky, 2 used by a wholesale house in Pittsburg replaced 12 horses. In Pittsburg they mount steep hills with heavy loads, do it quicker, are more satisfactory, and are always on the job. INDIANA Trucks possess practical mechanical features that you cannot argue aside, features that solve the everyday trucking problem of the business man—features that make INDIANA Trucks more dependable than just ordinary trucks.

AGENTS—Get our liberal agency contract if still open for your territory—the INDIANA agency possesses money value—agents everywhere are making big money on the INDIANA. We furnish our INDIANA agents aggressive sales literature presenting an array of facts that a prospective buyer cannot ignore. Get the INDIANA agency, get into the harness yourself and pull, get our co-operation. If we cannot convince the truck buyer absolutely of the merit of a number of our INDIANA features over those of any other motor trucks in existence, it will be because he is deaf to logic and reasoning. Write us now, today. Do not delay.

HARWOOD-BARLEY MFG. CO.

207 Indiana Ave. :: :: :: MARION, INDIANA

THE FEDERAL

ONE TON TRUCK

$1800

Federal one-ton chassis, including seat, $1800. Body Type at purchaser's option. Wheelbase optional 110-inch or 144-inch. Motor, 4 cylinders, 30 horse-power. Magneto, high tension. Clutch 16-inch cone. Transmission three speeds forward and reverse. Tires, solid, 36x3½-inch front and 36x4-inch rear. Timken bearings.

Corporations of National Prominence Use From One to Ten Federals

What better proof of Federal quality and character can you ask?

These large corporations of national prominence have studied trucking problems thoroughly and systematically—every angle of them led to the Federal.

These corporations are engaged in most every line of business in different parts of the United States, conclusively proving that Federal quality and character are not confined to one business or one locality.

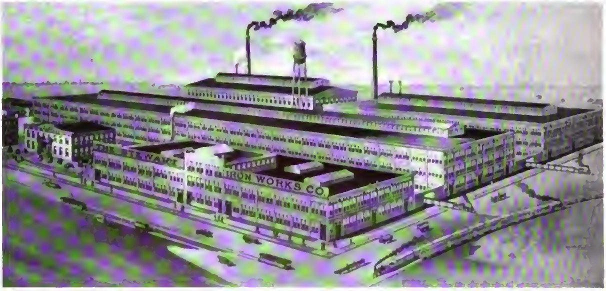
The Federal Motor Truck Company, Detroit, Mich.
New Factory, Dept. E, Leavitt and Campbell Avenues

Corporations of National Prominence Using Federals

Wm. J. Lemp Brewing Company
Armour & Company
Marshall Field & Company
Portland Railway, Light & Power Co.
Ward Bread Company
American Bank Note Company
Detroit Stove Works
Southern New England Telephone Co.
Abbott Motor Car Company

Established 1886

Incorporated 1903


STEWART IRON WORKS CO.

Paid up capital, $1.000.000.00

Capacity, 10.000 trucks per annum

IMMENSE PLANT OF THE
STEWART IRON WORKS CO.
MANUFACTURERS OF THE

STEWART
CINCINNATI, OHIO

ONE TON TRUCKS

If sterling quality of design, material and workmanship count for anything in the automobile world, the Stewart 1-ton delivery truck is assured of a dominant position in Truckdom. Everything in the Stewart plant is conducted along gigantic lines, and the result is that quality and economy come from this large scale production. The most approved engineering ideas on plant equipment, design, necessary parts and material have been employed by specialists to make the Stewart 1-ton delivery truck a pride to its manufacturer, a satisfactory purchase to users and a source of income to dealers.

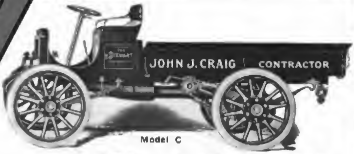
All our efforts to compete in the commercial car world are concentrated in our 1-ton truck. Our product is backed by twenty-six years of successful manufacturing in the iron and steel industry, and today is just as famous among motor trucks as the Stewart Iron Works Company is among manufacturers of iron and steel.

We are qualified by experience to build a high class truck and we are able by our reputation to guarantee every vehicle that leaves our factory.

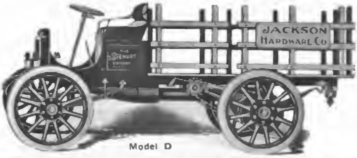
THE STEWART IRON WORKS COMPANY
CINCINNATI, OHIO

The dealer who holds his own in these days of intense competition, is the man who is wise enough to recognize a good agency when he sees it and who is quick enough to profit by its advantages before others beat him to it. The Stewart agency in your section means three things: dignity in the business element of your community, satisfied customers and a record breaking balance of profit.

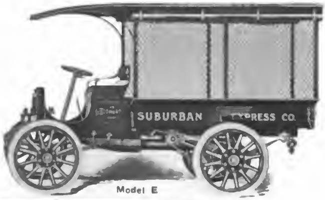
We have a truck that is mechanically perfect in design and construction. We are giving it widespread and well chosen publicity and it remains for you to supply the demand which we are creating. Business relations between you and us will be mutually advantageous. Don't hesitate. Every day means a possible loss of sales. Do it now. Write for our agency proposition.



Model C

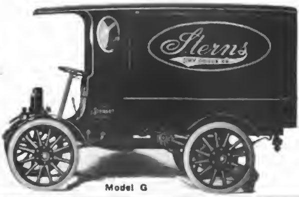


Model D


SUBURBAN EXPRESS CO.

Model E

Model F



Model G

All Prices Include Bodies

Models C & D
Exactly as shown

$986

Model E
Exactly as shown

$1096

Model F
Exactly as shown
Extra fine body job

$1246

Model G
Exactly as shown
An ultra aristocratic body job

$1296

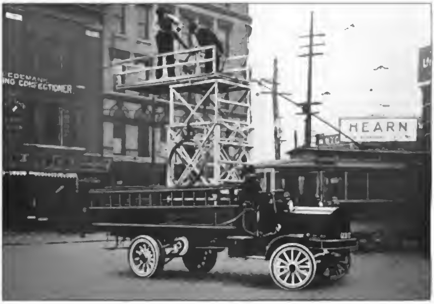
The conservative, successful business man will not invest in a motor truck until he has investigated the merits of the Stewart 1-ton delivery truck.

If you are considering the purchase of a one-ton delivery truck to best serve your purpose, correspond with us and let us show you why it is not necessary for you to pay out from $500 to $1000 more money for a one-ton truck that cannot under any circumstances be more efficient or produce better results. Practical economy begins with the purchase of a one-ton Stewart Delivery Truck.

Write for our proposition in detail. We show you *clearly and honestly* a money-saving, service increasing plan which *must* convince you with its *Logic* because it is *The Truth About The Subject.*

THE STEWART IRON WORKS CO.
CINCINNATI, OHIO

ELECTRIC COMPANIES PREFER PACKARD GASOLINE TRUCKS



One of the four Union Railway Company trucks in service in New York City

THROUGHOUT the United States and Canada, electric companies are using Packard gasoline trucks under conditions that call for stamina and great dependability. For rush repair jobs on street railways, gas mains and lighting systems, the Packard truck is chosen because it is ready to go wherever it is needed at the time it is needed most.

The Union Railway Company of New York, for example, is operating four Packard three-ton truck chassis with special tower wagon bodies. These trucks have been in almost constant service since October, 1910. This company's tables of the comparative costs of operation show that the Packard trucks are the most economical heavy duty vehicles.

Twenty electric companies are using forty-two Packard trucks:

British Columbia Electric Ry. Co., Vancouver, B.C. (4)
Capital Traction Company, Washington, D. C.
Columbia Electric Street Railway Light & Power Co., Columbia, S. C.
Denver City Tramway Company, Denver, Colo. (4)
Detroit United Railway, Detroit, Michigan (2)
Duluth Edison Electric Company, Duluth, Minn.
Edison Electric & Illuminating Co., Brooklyn, N. Y.
Great Western Power Co., San Francisco, Cal. (2)
Los Angeles Gas & Electric Corp., Los Angeles, Cal. (6)
Lynn Gas & Electric Company, Lynn, Mass. (2)
Manhattan Electric & Supply Co., New York, N. Y.
Metropolitan Street Railway Co., Kansas City, Mo.
Oakwood Street Railway Company, Dayton, Ohio
Omaha Power & Light Company, Omaha, Neb.
Pacific Gas & Electric Co., San Francisco, Cal. (5)
San Paulo Tramway Power & Light Co., San Paulo, Brazil, S. A.
Sierra & San Francisco Power Co., San Francisco, Cal. (2)
Union Gas & Electric Company, Cincinnati, Ohio
Union Railway Company, New York, N. Y. (4)
Winnipeg Electric Railway Company, Winnipeg, Man.

Ask the man who owns one

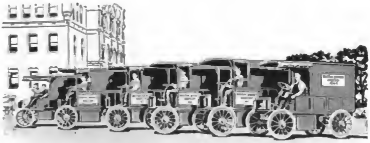
Packard Motor Car Company, Detroit

That Question of Mileage

It isn't a case of how many miles per day you *can get* out of a truck, but how many miles you *really need* to make your deliveries.

If your work calls for from 100 to 200 stops per day your mileage is limited to what you can make in your working day. With 150 average stops and waits, for example, you couldn't possibly cover over 45 miles in nine hours.

So don't worry about Electric Truck "limitations." In its own field there is nothing which can compare either in efficiency or economy with the G. V. Electric. You either want a truck for short haul, frequent-stop work or one for long haul, cross-country work. Which does your work require?



G. V. Electric Trucks

were the pioneer Electrics and they are the leaders still. There are several good Electrics but only one BEST—"the G. V."

The General Vehicle Co., Inc., will *treble* production facilities in 1913. Our business has doubled annually since 1910 and the G. V. selling policy doesn't encourage hysterical distribution either. Quality commands its price. If not today, then tomorrow.

You know right at this minute whether your deliveries call for many stops or for few stops with good distances between. If the former, better look into the Electric right away.

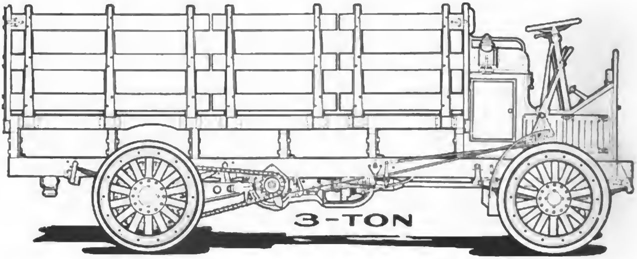
G. V. Catalogue 73 answers lots of the questions you would naturally ask first and it won't have an order taker on on its heels either. Write for it today.

The GENERAL VEHICLE COMPANY, Inc.
Principal Office and Factory Long Island City, N. Y.

NEW YORK CHICAGO MINNEAPOLIS BOSTON PHILADELPHIA CINCINNATI ST. LOUIS

We Finance the Truck Buyer

The Universal Motor Truck Company Announces the Most Business-like and Most Liberal Motor Truck Proposition Ever Offered to the Trade.



Here's Our Proposition; It Is Very Simple

A deposit of a **certain percentage** of the cost of the truck **on delivery,** the **balance in time payments,** which will hardly exceed what you would have to pay if you rented a truck by the day.

Why We Can Sell On the Time Payment Plan

Universal Motor Trucks are good trucks.

They are guaranteed.

We know that they will give satisfaction or we could not afford to let the purchaser run them for a year on a time payment basis.

Universal Trucks are manufactured in the largest factory in the country devoted exclusively to making high grade commercial vehicles.

Prices are no higher than trucks sold for cash.

Universal Motor Truck prices are no greater than those of other standard makes of trucks and in some cases they are less.

$2750 for a 2-ton chassis—$3400 for a 3-ton chassis; bodies cost from $150 up, according to your needs. Prices f. o. b. Detroit.

There is no longer any question about the economy value of motor vehicles as applied to business.

Do not let your competitors get ahead of you; here's a chance to be up to date, to make the truck pay for itself.

Tell us about your requirements and let us make you a recommendation.

Universal Motor Truck Company

FACTORIES: DETROIT, MICHIGAN

Fred K. Parke, General Manager **502 Theodore Street**